INPUT®

U.S. Market Analysis Program

U.S. Professional Services Market 1991-1996

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NOVEMBER 1991

U.S. PROFESSIONAL SERVICES MARKET

1991-1996

INPUT®

1280 Villa Street, Mountain View, California 94041-1194 (415) 961-3300

Published by
INPUT
1280 Villa Street
Mountain View, CA 94041-1194
U.S.A.

Market Analysis Program (MAP)

U.S. Professional Services Market, 1991-1996

MAPF1 • 506 • 1991

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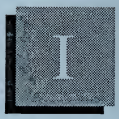


Introduction

Introduction

This report is part of a series of market analysis reports written each year by INPUT on the key segments (delivery modes) of the U.S. information services industry. The delivery modes analyzed during 1991 are as follows:

1. Applications Software Products
2. Turnkey Systems
3. Processing Services
4. Systems Software Products
5. Network Services
6. Professional Services
7. Systems Integration
8. Systems Operations

The first six delivery modes are covered in reports included as part of INPUT's Market Analysis Program (MAP), a planning service for information services vendors. The last two delivery modes are covered in market analysis reports included in INPUT's Systems Integration and Systems Operations programs.

A

Purpose and Organization

1. Purpose

This report analyzes the professional services delivery mode of the U.S. information services industry.

- The report includes five-year forecasts, an assessment of market drivers, analysis of competitive trends, and identification of leading vendors.

- The report assesses trends and events within the U.S. economy, the U.S. information services industry, and the systems software delivery mode to provide the reader with a comprehensive foundation for understanding this market sector and for anticipating future directions.

The report provides readers with insights and information that will help them:

- Review the forces shaping the market
- Develop internal corporate financial projections
- Identify new markets and product and services opportunities
- Assess the competitive trends
- Determine potential market directions
- Assist in prioritizing investments

2. Organization

This report is organized as described in Exhibit I-1. Each delivery mode report within the Market Analysis Program follows this format. The industry and cross-industry sector reports, described below, follow a very similar format.

This report is published in segments throughout the year to subscribers to INPUT's Market Analysis Program. Subscribers will receive the material as the research and analysis is completed, with the first chapters shipped in the second quarter. The forecast is shipped in the third quarter.

EXHIBIT I-1

Market Reports Format

I. Introduction
- Introduction and definition of the delivery mode and its substructure or segments.

II. Executive Overview
- Synopsis of the entire report, written at the end of the year.

III. General Business Climate
- An overview of the business climate within the information services industry as a whole and the particular market segment of each report.

IV. Information Systems Environment
- The information systems environment and user perspective as it relates to the specific delivery mode or market.

V. Vendor Issues and Trends
- An assessment of the delivery mode from the vendor point of view.

VI. Information Services Market Forecast
- Presentation of the information services market forecast by delivery mode and submode.

VII. Competitive Environment
- Discussion of the competitive environment for information services within the delivery mode—with market share analysis and vendor profiles.

VIII. Conclusions and Recommendations
- Summary of risks and opportunities.

A. INPUT Definition of Terms
- Definitions and descriptions of market structure and terms used throughout INPUT's reports.

B. Forecast Data Base
- A detailed forecast by delivery mode, submode, and industry/cross-industry sector. Contains a reconciliation to the previous year's Appendix B.

B

Scope and Methodology

1. Scope

This report addresses the U.S. information services industry for the systems software sector (delivery mode). It includes user expenditures that are noncaptive and generally available to vendors. Many large organizations have portions of their information services requirements satisfied by internal divisions. The resulting expenditure is not available for competitive bid by the general vendor community and is not included in INPUT's projections. The noncaptive distinction is important and is addressed in more detail in Appendix A.

a. Information Services Industry Structure

Exhibit I-2 defines the structure of the information services industry as used by INPUT in its market analysis and forecasts. The industry consists of eight delivery modes, each of which contains a number of submodes.

- *Delivery modes* are specific products and services that satisfy a given user need. *Market sectors* specify who the buyer is and *Delivery Modes* specify what the user is buying.

- INPUT develops a five-year forecast for the delivery mode and each of the submodes.

EXHIBIT I-2

Information Services Industry Structure—1991

Source: INPUT

INPUT also publishes market sector reports analyzing 15 industry and 7 cross-industry market sectors. These reports, published annually by INPUT, analyze the information services opportunities in industry sectors such as insurance, transportation, and discrete manufacturing—and in cross-industry sectors such as accounting, human resources and office systems.

The relationship between delivery mode forecasts and market sector forecasts is shown in Exhibit I-3.

For a more complete discussion of INPUT's information services industry structure and market sector definitions, please refer to INPUT's *Definition of Terms*.

EXHIBIT I-3

Delivery Mode versus Market Sector Forecast Content

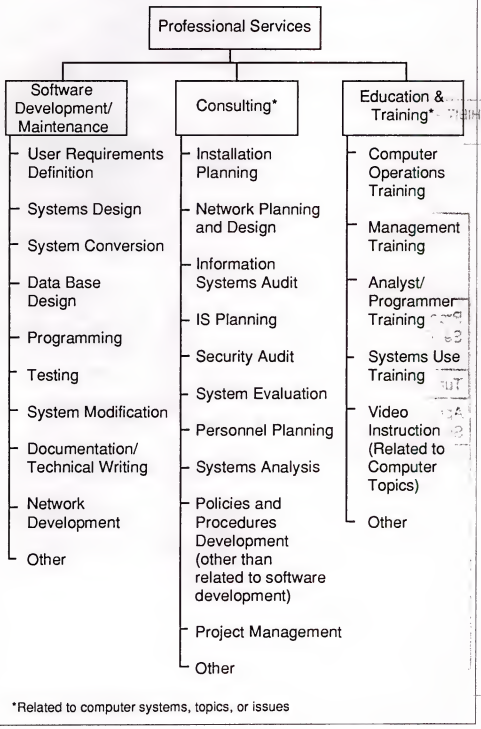
Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction	X	X	
	Utility			X
	Other			X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform	X		
	Applications	X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications	X		
	Electronic Information Services	X		X
Systems Software Products				X

b. Delivery Mode Description

The structure of the professional services delivery mode, as shown in Exhibit I-4, is composed of consulting, software development/maintenance, and education and training submodes.

EXHIBIT I-4

Professional Services Market Structure



*Related to computer systems, topics, or issues

Professional services vendors market consulting, software development, and education and training services alone and in combinations. There are also vendors that market selected functions only, such as documentation or conversion services, or one of the primary services, such as training.

- The three submodes within the professional services delivery mode—consulting, education and training and software development—are described in full in Appendix A.

- All professional services activities are considered as purchased by specific industry sectors, that is, it is industry specific. Thus the forecasts for professional services within the 15 industry sectors adds to the total of the forecasts for the delivery mode as a whole.

- Professional services may also be delivered as a component of the systems integration or turnkey systems delivery modes. The expenditure for these services are part of a larger expenditure and are not included as part of the professional services delivery mode. Such expenditures are included in the respective systems integration and turnkey systems delivery modes.

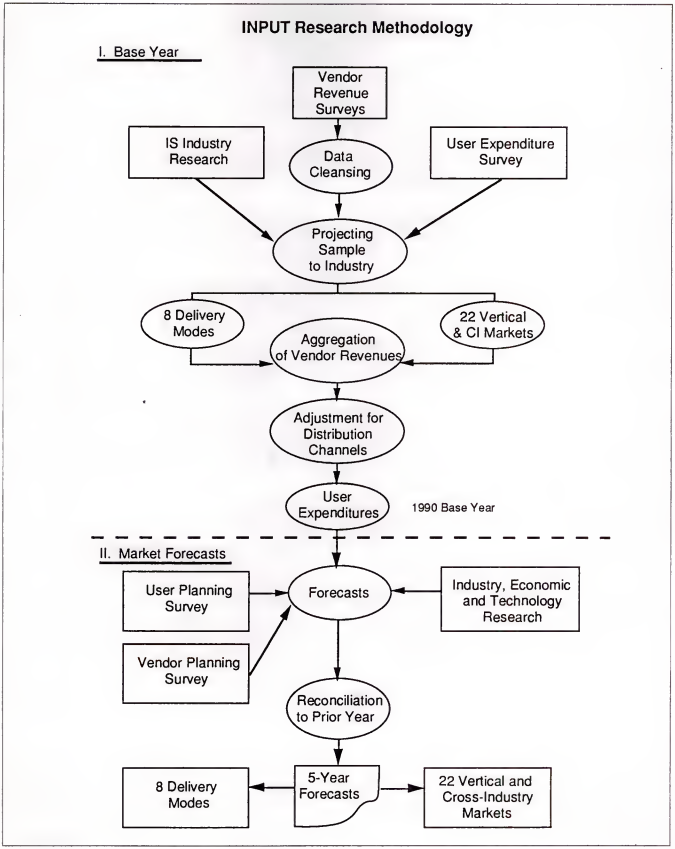
- Professional services sold in conjunction with processing services or network services are included in the definition of the professional services sector.

- Professional services sold in conjunction with the licensing of a software product for implementation and training are considered part of the software product sale. Only professional services to customize a software product or services provided after the original sale (and other than maintenance fees) are included in the professional services delivery mode.

2. Methodology

INPUT's methodology for market analysis and forecasting is summarized in Exhibit I-5. As in past years, INPUT has continued to survey information services vendors to determine their U.S. information services revenues, and to query information systems organizations about expenditures and outside services acquisition plans. INPUT interviewed vendors a second time to understand their views of market opportunities over the short and long terms.

EXHIBIT I-5



INPUT's annual forecasting process is broken into two major parts: base-year expenditure calculations and market forecasts. Each is briefly described below.

a. Base-Year Expenditure Calculations

- INPUT determines previous-year information services revenues for the eight delivery modes and 22 industry and cross-industry sectors for hundreds of vendors. Estimates rely upon interviews, public data, and INPUT's own estimates.
- The initial data are projected to represent the entire information services industry.
- Adjustments are made to eliminate duplications due to distribution channel overlap and to assure that captive information services expenditures are not included.
- The result is a base-year (1990) user expenditure for each of the 22 vertical and cross-industry sectors and the 8 delivery modes.

b. Market Forecasts

- In the forecasting step, INPUT surveys information systems executives to determine their projected expenditure levels, both in aggregate and for each of the outside information services categories.
- In addition, a second set of vendor interviews is conducted later in the year to obtain an understanding of how key vendors view the market and its opportunities.
- The result is a five-year forecast for each of the 22 vertical and cross-industry sectors and the 8 delivery modes. The delivery mode and market sector forecasts are correlated according to the diagram in Exhibit I-3.

To complete the process, INPUT reconciles its new forecasts with those from the previous year. Differences due to market restructuring and other factors are explained. One may use these projections to track INPUT's forecasts from year to year.

C

Economic Assumptions

INPUT forecasts are presented in current dollars (i.e., 1996 market sizes are in 1996 dollars, including inflationary forecasts). In developing the five-year forecasts, INPUT has incorporated economic assumptions for the U.S. economy as a whole.

The GNP and GNP Deflator growth rates used in INPUT's market projections for 1991 through 1996 are from the CONSENSUS™ forecast, a product of Blue Chip Economic Indicators of Sedona, Arizona. The Blue Chip CONSENSUS forecast is derived from a leading panel of economists representing leading financial, industrial, and research firms across the U.S. and has a 13-year track record of balanced and accurate projections.

The 1991-1996 assumptions are contained in Chapter VI, Information Services Market Forecast.

D

Related Reports

Related reports of interest to the reader are:

1. U.S. Markets

- *U.S. Application Solutions Market Analysis Report, 1991-1996*
- *U.S. Processing Services Market Analysis Report, 1991-1996*
- *U.S. Systems Software Products Market Analysis Report, 1991-1996*
- *U.S. Systems Integration Market Analysis Report, 1991-1996*
- *U.S. Systems Operations Market Analysis Report, 1991-1996*
- *U.S. Industry Sector Markets, 1991-1996* (15 reports on all major industry sectors—e.g., insurance)
- *U.S. Cross-Industry Sector Markets, 1991-1996* (7 reports on information services markets that serve all vertical industry sectors—e.g., accounting)

2. European Markets

- *The Western European Market for Computer Software and Services, 1991-1996*
- *Systems Software Products—Western Europe, 1991-1996*
- *Trends in Processing Services—Western Europe, 1991-1996*
- *Systems Integration Market Forecast—Western Europe, 1991-1996*
- *Systems Operations Market Forecast—Western Europe, 1991-1996*
- *Western European Network Services Markets, 1991-1996*

The European markets are also analyzed on a vertical basis for discrete and process manufacturing, insurance, banking and finance, and retail and wholesale distribution.

Executive Overview

To be published at a later date

General Business Climate

III

General Business Climate

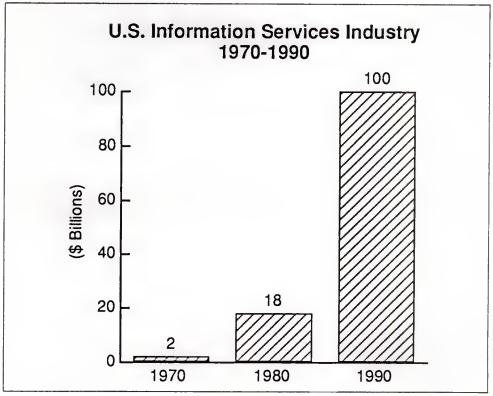
In this chapter INPUT provides an overview of the current business climate for the U.S. information services industry and for the professional services delivery mode.

A

1990 Results

In 1990, the U.S. information services industry reached a milestone, ending the decade at about $100 billion in size. As Exhibit III-1 shows, the industry increased in size over five times during 1980s and is 50 times larger than it was in 1970, when the industry represented $2 billion in user expenditures.

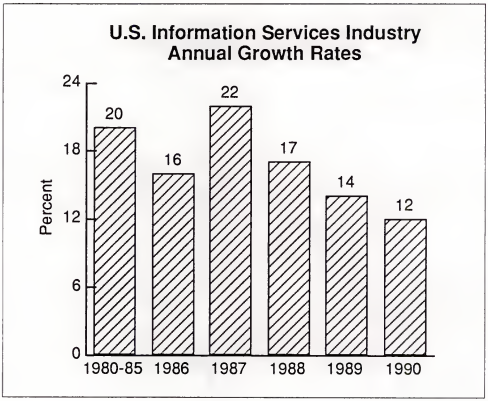
EXHIBIT III-1



During 1990, the industry grew at just under a 12%—from about $90 billion to $100 billion. As Exhibit III-2 indicates, 1990 reflects an intensification of a decline that started in 1989. The average annual growth during the first eight years of the decade was over 19%.

Worldwide, the industry continues to experience greater growth rates of close to 20%, and many U.S. vendors are experiencing growth that exceeds that of the U.S. industry as a whole. This growth is primarily due to international sales, but is also due to the focus on specific industry markets. Inflation rates and somewhat stronger economies are driving the industry to higher growth levels overseas.

EXHIBIT III-2

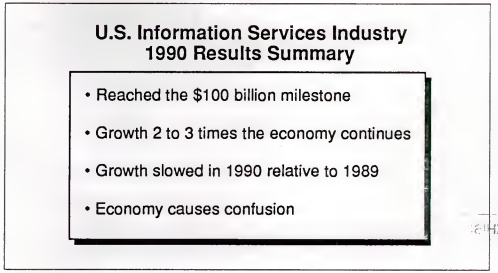


On a delivery mode basis:

- The smaller systems integration, systems operations, and network services delivery modes are growing faster than the rest of the industry.
- The software products sectors grew at or slightly above the industry average.
- The larger professional services and processing services sectors, as well as the smaller turnkey systems sector, are growing slower than the industry average.

Exhibit III-3 summarizes 1990 results.

EXHIBIT III-3



Growth in professional services fell to a level of 10% in 1990, which was lower than the growth during any year in the past decade. In some vertical markets, growth of professional services was two to three times less than growth during 1988.

Although the economic downturn was the principal factor causing the drop in growth of information services, it did not have an equal impact on the use of professional services in different markets or on the vendors offering these services. Some major vendors as well as smaller ones showed growth of over 20%. Other vendors, including those with earnings over $100 million per year, experienced sharp impacts in revenue and earnings. As a result, many vendors are evaluating changes in the objectives, types of assignments, and technological and other skills associated with professional services work.

B

Driving Forces

There are a number of fundamental forces impacting the information services industry in the 1991-1992 timeframe that will have measurable impact on the overall growth rate for the 1991-1996 five-year period covered by this market analysis report. Each force will affect the industry as a whole, as well as each of the eight delivery mode sectors used by INPUT to analyze the industry and its key trends.

Exhibit III-4 identifies six primary driving forces impacting the U.S. information services industry. The impacts are multidimensional, fundamental, and long lasting. Each is discussed in this chapter and throughout this report.

EXHIBIT III-4

Information Services Industry Primary Driving Forces, 1991-1996

- The economy
- Globalization
- Influence of large vendors
- Outsourcing (buy versus make)
- Shifting technology foundation
- The changing buyer

C

Key Trends

1. Economic Impacts

The economy, as well as the overall size of the information services industry, is a significant factor in the user expenditure level for information services and software products.

- The inflation rate of the past few years has been much more modest than in the mid-1980s. INPUT forecasts and market sizes are in current dollars—thus lower inflation means lower growth.
- Real economic growth had been modest over the past few years prior to the recession that started in late 1990. Deferred and canceled expansion plans in all industry sectors certainly slow the expansion of information services expenditures.
- The shift of information processing to smaller computers lowers the software products investment, based on current pricing practices. Quantities of software products sold increase, but revenue levels grow at more modest rates.

In 1990, a year with little to no real growth in the overall economy and inflationary growth of about 5%, the information services industry grew 12%.

- INPUT's 1990 and 1991 economic assumptions were for nominal GNP growth of 5.4%; real GNP growth was 1% or less.

- At this point in 1991 (the second quarter), the economy remains in no-growth status, with some improvement expected by late in the year. At the same time, inflationary pressures are modest. INPUT expects another modest growth year in 1991 and again in 1992. The expected slow upturn will have the following positive and negative impacts on the U.S. information services industry in the near term:

- Positive impacts include:

  - Increased motivation to buy rather than make, in particular for larger systems requirements. Response time and impact on business operations are the key criteria.

  - The interest in systems operations, which permits organizations to redeploy capital investments and lower direct headcount, is being reinforced.

  - A tight economy is helping develop interest in lower-cost solutions that come from client/server-based applications software products.

- Negative impacts include:

  - Decision processes are lengthened in a tight economy, causing deferral of major information systems projects.

  - With tight information systems budgets, the internal information systems staff can be favored over contracted professional services vendors, thus negatively impacting a major segment of the industry.

2. Globalization

INPUT has cited globalization as a driving force for the past three years. During that time markets have opened, vendors have expanded their international focus, and users have begun to expect global capabilities.

- The European market is making progress toward a single market. Now 1992 is less than a year away and many changes are apparent. In addition, the European market is stronger than the U.S. market, although both are suffering in the current economy.

- The worldwide orientation of the larger services vendors is verified by the investments in Europe by Computer Sciences Corporation and Digital Equipment and by the ever-expanding interest of Japanese vendors in the U.S. information services industry.

The primary positive impact of globalization is the ability of larger vendors to balance their businesses in multiple markets with less impact from market downturns.

The primary negative impact from globalization is that it may make it harder for smaller vendors to grow and/or maintain independence.

3. Influence of Large Vendors

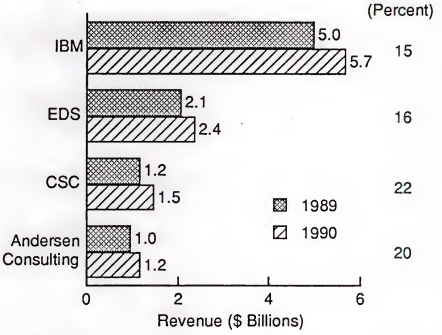
The influence of the larger information services vendors has increased significantly over the past few years.

- The newer systems integration and systems operations sectors, though smaller than more traditional sectors such as professional services and processing services, are growing faster than the traditional sectors and are dominated by the leading vendors.

- A number of larger vendors are growing faster than the overall market. Exhibit III-5 lists four of the largest information services vendors that can be considered multi- or full-service vendors and reveals their U.S. 1989 and 1990 information services revenues. All four increased information services revenues by at least 15%, greater than industry growth as a whole.

- Certainly there are numerous smaller firms that are also growing faster than the general market, but overall, the dominance of the larger vendors is increasing.

EXHIBIT III-5



The large-vendor influence is increasing in other ways as well.

- Starting with IBM, many large services vendors are making minority and majority investments to gain influence on technology, access to software products for remarketing, and market share.

- DEC's investment in Kienzle in Europe and EDS's investment in ASK Computer Systems are two examples of large vendors' seeking new channels and resources.

- Consolidation is also a factor. Mergers among the major accounting firms have reduced the number of players, but have given two of the firms (Ernst & Young and Deloitte Touche) added resources to follow the example of Andersen Consulting. A third—Price Waterhouse—is also experiencing significant growth in its information technology-based business.

The increasing use of business consulting linked to professional services has provided a means for the large accounting and consulting firms, as well as some large information services firms, to gain a greater share of the industry. INPUT expects this trend to continue over the next few years. The opportunity for the smaller, more specialized software product or services vendors is not disappearing, but it is changing character.

- Alliances with larger vendors will be essential, at least as secondary sales and support channels.

- Specialization—in terms of the technology used or the industry served or both—will become more important and common.

The continuing increase in the strength and impact of the larger vendors will have the following positive and negative impacts:

- Positive impacts include:

  - The larger vendors have the financial strength to minimize the risk of systems management services.

  - The larger vendors have financial resources available to invest in new technologies, often through investment in smaller and specialized firms.

- Negative impacts include:

  - Alliances may become a requirement for smaller technology firms to survive and prosper.

  - The dominance of the larger vendors will continue to grow.

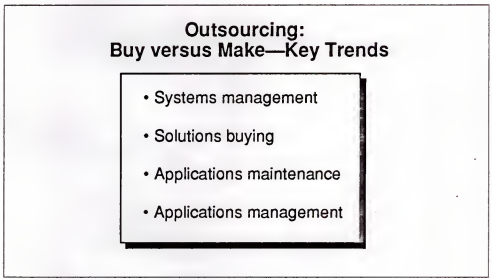
  - Larger vendors tend to move more slowly, which will hamper development and acceptance of new technology. This slowness will provide opportunity to small vendors that seize technology initiative.

4. Outsourcing (Buy versus Make)

Since its inception, the information services industry (services and software products) has tended to outgrow the internal information services budget by continuously creating new products and services that permit the information systems function to outsource (buy versus make). This has always been an outsourcing industry. And though growth has slowed, a number of factors will permit continued growth that exceeds growth in the economy, the computer hardware sector, and the internal information systems budget.

Key trends in outsourcing are listed in Exhibit III-6.

EXHIBIT III-6



a. Systems Management

Outsourcing the management of information systems or at least significant elements of information systems continued to gain momentum during 1990. Helped more than hindered by the recessionary economy, the inclination of the general management of large organizations to consider outsourcing increased.

The ability to transfer much of the financial risk and, perhaps more importantly, the technological risk of a project or operations to a specialist has numerous attractions for general management.

- The attraction that will become more and more important will be the ability to disconnect the information technology part of the solution from the business decision. General management is concerned with business results, and does not want to debate the pros and cons of a technology. The appeal of the vendor's offer to take on risk either in a project (systems integration) or in operations (system operations) can only grow during the 1990s.

- The nature of most outsourcing activities within larger organizations often makes them favor the large vendors, adding impetus to the trend described above. If there is major risk involved, the buyer will bet on the company most able to accept risk and take responsibility.

- Perhaps the most important attraction is the ability of buyers to gain access to a broad information technology on an arm's-length business basis in a single decision.

  - The systems integration vendor can provide all the needed expertise in a new technology at the beginning of a project. There is no internal training lag time while the information systems staff gains the knowledge and experience required.

  - The systems operations vendor can provide a full utility-based service at a predictable cost over a number of years. This should make for fewer surprises from the overall information systems program.

b. Solutions Buying

Buying applications software is a well-established practice in the U.S. market where the use of packaged software is commonplace. However, the current change in the way U.S. organizations are managed and the availability of low-cost, high-performance client/server computing is bringing new impetus to the application solutions market.

- The fundamental decentralization of U.S. business management with the corresponding reduction of corporate staffs is creating a major requirement for business unit (distributed) application systems. Furthermore, the buyer is not an information systems professional and is willing to outsource (buy) with some customization.

- Just when the smaller business unit needs independent application solutions, there is a hardware revolution to support the need. Client/server technology provides affordable, high-powered computing.

The ability to find a VAR that can provide a package plus customized systems on client/server-based software is bringing the solution value of systems integration to the decentralized business unit.

c. Applications Maintenance and Applications Management

In line with the shift to outsourcing systems management to systems integrators and systems operations firms, the buyer is also seeking to gain more-defined relationships with more-traditional professional services vendors. Instead of contracting for temporary personnel, the buyer is beginning to contract for services like applications maintenance and applications management.

- Applications maintenance is contracted, 24-hour support of existing applications systems. The vendor provides a set level of services and interacts directly with the end user.

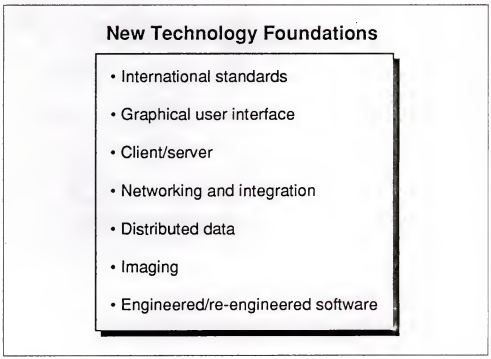
- Applications management is contracted management of development and maintenance of a set of applications. The vendor provides the software and all of the expertise and staff to assure that the application is successfully used over an extended period. Applications software products firms can become applications management vendors for their clients or let some other vendor do it.

5. Shifting Technology Foundation

Significant new technologies became available in the late 1980s and are gaining momentum in the 1990s. An underlying characteristic of much of this new technology is a shift in the technological foundation. Many elements of technology are shifting to new foundations.

Exhibit III-7 lists the key elements of this shift in underlying technology. Each element is causing organizations to stop and rethink key aspects of their information systems infrastructure strategy. Rethinking can slow the adoption in the short term, and create new vendor opportunities over the longer term.

EXHIBIT III-7



All of these new technologies and foundations cause confusion in the industry and with the buyer. Confusion slows buyers' and vendors' decision making. Strategies need to be revised and investment plans shifted, and education is required.

- Standards are driving every major computer manufacturer and software products developer to revise strategies and change product development plans. New products are delayed and then require longer initial sales introductions.

- The user interface of the personal computer in its graphical pull-down menu and windowing form will be the only interface acceptable to users from now on. The text-based interfaces of the 1970s and 1980s will no longer be tolerated. Every major software product developer is re-engineering the user interfaces to its products.

- Downsizing, the common term for moving an application to a client/server-based installation, will be the greatest phenomenon of the early 1990s. Whether or not the installation is actually downsized, it will be moved to a new processing location and take on new characteristics. Major re-engineering of internal systems by the information systems function and a shift to buying server-based application products is underway. All of the impacts are not known. One, software products pricing based on the size of the platform, will have to change. Certainly some confusion exists and is impacting buying decisions.

- The growing use of PCs, workstations, and LANs has mandated a move to integrate the information networks of large and small organizations. Today's networking products permit the distributed applications that have been discussed for years but were never possible.

- The way data is stored and turned into information has been fairly constant since the creation of the first hierarchical DBMS in the early 1970s. Since then the challenge was to build data bases, not to consider building them with new types of components. The shift started with commercial use of relational DBMSs, but it is the distributed DBMS, and perhaps more importantly image processing, that will cause major re-engineering of the data base architectures of larger organizations. Major new investment is required and of necessity will come over time.

- The age of truly engineered and re-engineered software through CASE technology is dawning. In five years the approach to maintenance will have finally changed and there will have been major advances in programmer productivity.

The positive and negative impacts of the shift in technological foundation are listed below. Certainly over the five-year period of this forecast the positives greatly offset the negatives.

- Positive impacts from this shifting technology foundation include:
  - New types of solutions will become available.
  - The role of the end user in information systems can continue to expand.
  - Opportunities for new as well as existing vendors are created.
  - Application systems can be increasingly molded to the character of the organizations they support.
- Negative impacts are:
  - Any shift causes confusion and hesitation in the near term. The magnitude of the current technology shift could cause confusion and slow investment through the middle of the decade.
  - The size of the task to shift to client/server technology in organizations with large centralized systems causes conflicting priorities between re-engineering and meeting new requirements.
  - The technology shift now in process is creating a significant additional training and education requirement.
  - Growth is slowed while the new technology is understood and learned.

6. The Changing Buyer

The decision maker for the purchase of information services remained relatively constant until the late 1980s. The information systems executive and key staff (systems development and data center operations managers) decided when to go outside and who to contract with.

This leadership has changed significantly in the past few years and promises to change even further. As the information services vendor moves to provide a full long-term service or a full solution, the general manager is becoming the buyer. The impacts are significant.

- Technology becomes less important and the business or operational impact becomes more important.
- The impact of the information systems function becomes more consultative and less direct.
- The ability to try new ideas and approaches is increased.
- The time to completion is controlled by the organization's ability to afford, not the ability of information systems to develop.

D

Summary

The year 1991 is exhibiting significant changes from the 1980s. The changes suggest more modest, but continued strong and stable, growth for the information services industry.

- An economy that does not shift quickly helps management make longer term decisions, albeit at a slower pace.
- A market of $100 billion that is strongly impacted by the direction of the larger vendors should be expected to grow somewhat slower.
- The increasing tendency of larger organizations to turn to vendors for services that include real and significant elements of systems management and have a solutions orientation will lead to larger, longer term decisions—decisions that can take longer but have a lasting impact.
- The shift in the underlying technology foundation is for the better—more valuable and productive applications solutions will result. But shifts bring re-engineering, reinvestment, and retraining—and require time and money.
- The role of the general manager concerning the deployment of information technology continues to increase. In many instances the general manager is more influential than the information systems manager, particularly regarding major decisions. Over time the general manager's influence will have positive impacts on the size and growth of the information services industry—as long as the vendors provide satisfaction.

Information Systems Environment

Information Systems Environment

A

Needs Influencing Use of Professional Services

The changes in the selection process and use of professional services that started to emerge in 1989 and 1990 will have an impact through the period 1991 to 1996. These changes encompass negative economic impacts, greater influence of users on professional services in general, and the effect of new technology on professional services.

Total user expenditures for professional services grew at a rate of 10% in 1990, notably below the average level of growth that occurred during the 1980s. Growth of professional services in a number of vertical markets fell sharply from 1988 to 1991, particularly in banking, retail distribution, and discrete manufacturing, as well as in the federal government, as shown in Exhibit IV-1.

EXHIBIT IV-1

Growth of Professional Services in Selected Vertical Markets

Vertical Market	Growth During Calendar Year (Percent)		
	1988	1989	1990
Banking	19	5	7
Retail distribution	20	12	8
Discrete manufacturing	21	11	10
Federal government	12	5	4

These results, which appear mostly related to the slowing of the economy, did not have a uniform impact on professional services vendors, however.

- Many of the very large vendors active in supplying professional services—such as IBM, EDS, and Andersen Consulting, as well as some smaller vendors—continued to experience growth above 15% despite the changes occurring in this service mode.

- A number of other vendors, from very small firms to those with annual revenues in excess of $100 million, were affected by these changes and experienced low growth rates or experienced decreases in revenues in 1990.

In order to understand the negative impact that many vendors encountered, it is necessary to examine the factors that have become important in planning for the purchase of professional services in the past year.

- The major factor affecting the use of professional services in 1990 and 1991 was the economic downturn.

- A survey of corporate and other organizations made in support of this study indicates that about one-third have delayed or reduced expenditures for professional services for economic reasons during 1990.

In addition to using data from several hundred recent user interviews, a survey of over 30 organizations was conducted to obtain additional information that would aid this study.

- The survey included discrete and process manufacturers, distributors, banks, transportation companies, medical organizations, accounting and consulting firms, and government organizations.

- Organizations with budgets or revenues over $1 billion as well as smaller firms were contacted.

A series of exhibits based on these interviews is used in this chapter to indicate the rankings respondents give to driving forces, types of service, decision-making criteria, service expectations, and other information associated with the use of professional services.

Respondents mentioned budget reductions or delays in government and in commercial markets as reasons for delays or cancellations of expenditures, but they also emphasized that changes in the selection process for and use of professional services were having an impact. Despite budget changes, over 96% of respondents that have used professional services in the past note that they expect to use these services significantly during

the next five years, even if their objectives for using professional services are changing.

Exhibit IV-2 shows that obtaining professional services is more likely when it supports projects that are needed to improve earnings, reduce costs, or improve service.

EXHIBIT IV-2

Business Needs and Issues Driving Use of Professional Services

Needs and Issues	Average Importance of Issue Reported by Respondents*
Improvement of earnings/cost reduction	4.1
Improvement of customer services	3.5
Related to management objectives	3.1
Financial or management reporting	3.1
Operational needs	2.8
Other justified requests	1.9
Ad hoc requests	1.1
Maintain planned level of IS professionals	0.9

*Note: Where 5 = high and 1 = low

- Organizations are now concentrating more attention on performance.
- Several respondents noted that major information services or Big 6 vendors are aware of this emphasis on performance and approached respondents' companies with plans for projects that would increase revenues and lower or control costs. Vendors are suggesting projects that should be implemented to meet objectives, rather than waiting to review ideas for projects.

Competitive advantage was used as a justification for professional services use, but less frequently than it was previously mentioned.

- A few respondents noted that improvement of services was one focus of their competitive planning.

- These respondents felt shifts in objectives toward systems improvements that aided sales, reduced costs, improved service for customers, and made it easier to use systems were a result of the increased power of end users versus planning or middle management offices.

Top management also supports this focus of objectives.

- A respondent at a large bank who mentioned that there was less emphasis on competitive advantage in professional services objectives commented that his management was spending funds for high-level professional services directed at improving revenues and operating efficiency, while funds were not being provided to other projects that were under way.

- In addition to supporting the conclusion that increased emphasis is being given to projects involved with improvement of financial performance, this incident also indicated that professional services funds can be used to support management objectives, as shown in Exhibit IV-2.

Exhibit IV-2 also shows that it is less likely in the current economy that users will add staff to maintain a planned level of IS work.

- Users will allow some jobs to slip rather than use contract personnel or new hires.

- This shift in attitude has led some firms that specialize in supplying temporary IS people to examine the plans and needs of prospects more carefully so they can anticipate where people will be needed.

As Exhibit IV-2 indicates, corporate and other organizations report lower likelihood of obtaining budget funds for professional services needed to implement any project authorized for development within an organization.

- The objective of the project must be considered.

- Several respondents commented that their departments or the IS staff had found it easier in the recent past to obtain professional services personnel once a project had been authorized by central or departmental management than it is today.

- Project authorization no longer guarantees that expenditures will be approved for professional services.

In addition to examining the objectives that can drive the use of professional services, other factors to consider are the type of project aid that organizations are now seeking from professional services vendors and the skills being sought.

As illustrated in Exhibit IV-3, commercial users report that they are less likely to have professional services vendors develop full application systems than to have vendors customize software products, aid with internal development, re-engineer applications, or integrate applications software modules with existing software products or new hardware or communication devices. The latter type of work could lead to systems integration work as well as continuing professional services assignments.

EXHIBIT IV-3

Type of Aid Sought from Professional Services Vendors

Type of Aid	Average Interest Reported by Respondents*
Limited customization of application products	4.1
Integration of software products and/or new hardware or communication products	3.9
Aid internal development/enhancement	3.8
High-level technical aid to projects	3.7
Extensive customization of application products	2.9
Strategic and systems planning	2.8
Development of full application systems	1.6

*Note: Where 5 = high and 1 = low

- Aid in developing or enhancing application systems is the typical type of work that many professional services firms have done in the past. Newer firms devoted to the supply of temporary IS personnel now also serve this need.

- Midsized and smaller commercial organizations report that they are even less inclined than large organizations to have professional services vendors develop new application systems fully. They are more inclined to want customization or modification of applications software or turnkey products.

The federal government market tends to favor projects that enhance or add to existing systems, just as other markets do. The market for professional services in the federal government tends to favor contractor assistance in system development due to the declining availability of programming skills in the federal government. Government staffing levels and the backlog of software maintenance tasks at most government data centers also contribute to the demand for vendor assistance.

- On the other hand, congressional pressure on agencies to minimize or eliminate entirely the use of outsiders (and ex-government employees) in functions perceived as government management has caused the growth of vendor design and consulting work to drop toward a 2% growth rate, where it may possibly remain through the forecast period.

- Education and training in the federal government has eroded due to budget pressures as well. Much of it has been brought in-house or obtained as part of systems integration contracts. Growth of this submode will be negative during the forecast period.

User organizations tend to focus both on the type of aid being supplied—such as customizing or integrating application modules—as well as on the specific technical and project aid that they need to supplement in-house skills. For instance, over 92% of respondents report that they would rather use in-house skills than obtain COBOL programmers from a vendor for a specific assignment.

In the federal market, however, it could be more necessary to seek COBOL skills. A small number of available maintenance programmers has resulted from budget limitations.

Some users noted that they might seek vendor aid to modify software products that were developed in COBOL, but that they would seek knowledge of the industry and the applications software product rather than knowledge of COBOL.

Industry and application knowledge is important to prospects in general, as shown in Exhibit IV-4. It is one of the factors that has fueled the revenue growth of major IS vendors such as EDS, CSC, and Andersen Consulting, as well as other Big 6 firms.

EXHIBIT IV-4

Professional Services Capabilities of Greatest Interest

Capability	Average Level of Interest Reported by Respondents*
Industry/application product knowledge	3.9
Telecommunications or network skills and experience	3.6
Data base/4GL skills	2.8
Project management skills	2.6
CASE experience	2.6
Open systems experience	2.4
IT planning experience	2.3
Other	0.9

*Note: Where 5 = high and 1 = low

Other specific skills respondents report they would seek from vendors, as shown in Exhibit IV-4, include telecommunications experience and data base/4GL skills. Attention is also given to CASE (including re-engineering) and open systems experience. Interest in CASE has advanced to the point where users mention specific steps or activities regarding its use.

- One respondent noted that specific CASE skills, such as application generation, are being tried as a matter of course, but that use of CASE has not yet become a major factor in projects.

- A large energy company is using a front-end CASE tool and application generator to meet end-user needs, but it cannot generate solutions for multiple platforms (mainframe and client-server). Therefore, the company has sought aid from knowledgeable professional services and software firms to supplement internal capabilities.

Although open systems is felt to be a meaningful step for moving between hardware platforms, open systems use or skills in C language have not yet become major factors in vendor selection.

- One user reported that his firm had found it necessary to obtain UNIX skills from a professional services vendor to implement a project that used a workstation and a UNIX data base product; he doubted that many projects would require these skills, although he felt UNIX would increase in usage.

- The user also stated that it is possible to classify a number of professional services firms in terms of the capabilities they can supply, but questioned whether highly specialized firms could maintain sufficient work. Larger firms or firms focusing on industry needs may find work more easily and can always turn to specialized technical firms for needed skills when necessary.

Over 50% of respondents indicate that they would consider using small vendors in order to obtain necessary vertical knowledge or technical skills when critical projects require them.

- There are opportunities for smaller firms that develop certain specialized capabilities.

- A major oil industry firm and one of the largest federal government organizations are using a small vendor for projects involved with data base integration in which the small (less than $10 million in annual revenue) vendor has significant experience.

The use of professional services vendors can be delayed by economic conditions, as previously discussed, or deterred by other factors, as shown in Exhibit IV-5.

- Economic conditions and changes in organization, including mergers, can have an impact.

- Controls on purchasing by top management, or in accordance with the guidance of an IS office, are also reported as having an impact on use of specific vendors, even if users take the lead in selecting vendors or vendor products.

EXHIBIT IV-5

Business Factors That Can Deter Use of Professional Services Vendors

Business Factor That Can Deter Use	Average Impact of Factor Reported by Respondents*
Economic situation or financial condition of organization	4.1
Pending reorganization/merger	2.9
Organization-wide controls on vendors	2.8
IS guidance on IT use	2.1

*Note: Where 5 = high and 1 = low

B

Increasing Influence of Users

Both IS and user personnel are active in contacting and seeking assistance from professional services vendors, as reported in Exhibit IV-6, although user offices are more apt to initiate contact.

- Vendors must be prepared to handle separate or joint contact from both.
- Several IS respondents note that users seek their assistance in contacting vendors and evaluating their professional services capabilities even though they may not seek aid in making a final decision to use specific vendor services.

IS offices in some companies provide guidance in the use of vendors by listing favored or acceptable vendors or by listing the data base products, languages, telecommunications protocols, standards, and other considerations that must or should be adhered to. One major utility goes through a yearly process, administered by the purchasing department, of reviewing past vendors' performance and capabilities and performance of proposed new vendors in order to develop a list of professional services vendors that will be acceptable for use during the following year.

EXHIBIT IV-6

Initial Contact

Office Seeking Vendor Aid	Average Likelihood of Contact with Vendor*
User	3.4
IS staff	3.1
IS and user jointly	2.9
Other planning personnel	1.9

*Note: Where 5 = high and 1 = low

Some decisions on product/service usage, such as the evaluation of vendor network integration skills or the use of a temporary data base technician, have been handled by the IS staff, according to respondents. Users had been more active in evaluating the industry and application knowledge of vendors.

The final influence in deciding to use certain professional service vendors is swinging more toward user groups, as shown in Exhibit IV-7. However, the final decision may be made jointly by the user and IS or top management. The decision may also be made by top management, based on recommendations from users and IS, particularly when the total cost is above specified levels.

Among the major factors that are involved in making a decision, knowledge of the application and industry stand out, as indicated in Exhibit IV-8. The value or pricing of the work accomplished ranks second with knowledge of specific skills such as how to use a DBMS product or a CASE tool, followed closely by the size and stability of a vendor and demonstrated performance and experience.

Big 6 firms, large general consultants such as Booz Allen, and large IS firms such as CSC, EDS, and IBM would be favored by the criteria:

- They focus on knowledge of industries and applications.
- They are large and stable enough to reassure prospects and are inclined to seek technical aid to win bids when necessary.

EXHIBIT IV-7

Present and Future Decision Makers

Decision Maker	Average Likelihood of Decision Making*	
	Now	Future
User alone	3.4	Greater
User and IS	3.1	Greater
Top mgmt. or CEO	2.9	Less
CIO	2.4	Less
CFO	1.9	Less
IS alone (not CIO)	1.8	Less
Other	0.8	Less

*Note: Where 5 = high and 1 = low

EXHIBIT IV-8

Major Criteria for Selecting Vendors

Selection Criteria	Average Response*
Industry/application product knowledge	4.1
Knowledge of IS skills	3.1
Value or pricing	3.1
Similar work performed elsewhere (experience)	2.9
Size, stability of vendor	2.9
Project management	2.6
Contacts at organization	2.1
Other	0.9

*Note: Where 5 = high and 1 = low

Even the largest firms cannot address all needs in an optimal manner, however, and some smaller professional service firms are finding opportunities to establish areas of expertise.

In addition to focusing on the major criteria that influence decision making, user organizations also focus on the ability of vendors to satisfy their expectations for professional services. These expectations, which become more important in determining whether a user organization is satisfied with a given job or wants to use a vendor again, are analyzed in Exhibit IV-9.

EXHIBIT IV-9

Expectations of Clients Regarding Professional Services

Expectation	Average Response*
Vendor will take or assume responsibility	4.4
Development will meet schedule	4.2
Quality of work will be high	4.1
Personnel easy to work with/consultative/flexible	3.9
There were no unanticipated extra costs	3.8
Application is easy to use	3.7
Training was very good	3.4
Vendor was productive in getting work done, accepted, and in operation	3.2

*Note: Where 5 = high and 1 = low

Users expect work to be of very high quality, schedules to be met, costs not to exceed estimates, vendor personnel to be consultative and helpful, and applications very easy to use. Most of all, as Exhibit IV-9 indicates, users expect vendors to take responsibility for problems, difficulties, and working relationships that hinder progress.

- Some vendors are much more prepared to convince users that they are responsible, and to demonstrate responsibility during a project.

- Respondents at manufacturers, large energy companies, and banks noted that a strength of certain IS vendors was their ability to take responsibility.

A CIO at a large distributor pointed out that good salesmanship must be considered in all contact work and decision making. It can help to engender the sense of responsibility.

When asked what percentage of professional services jobs are successful, over 90% of users and IS personnel stated (some seemed defensive) that it is high or very high and point to the use of carefully prepared specifications, periodic reviews, and project management and monitoring tools as means of assuring satisfactory performance.

- Some respondents did admit that they had problems with projects due to their own difficulties in understanding and reviewing specifications.

- Several respondents mentioned the names of IS and Big 6 firms that had been effective in helping them review applications.

C

Changing Use of Professional Services

There are technological and other factors users feel could increase their utilization of professional services vendors. These factors, which are described in Exhibit IV-10, focus on the ability of professional services vendors to aid users in taking better advantage of new technology.

Commercial users appear interested in two areas:

- Bringing more capability to departments, offices, workgroups, or desktop users

- Upgrading their IT infrastructure with the accomplishment of required projects (i.e., integration of data bases and networks)

In addition, users want a more meaningful method of reviewing what proposed application systems and system changes will do. The application reviews that large systems integration firms incorporate into their way of working with clients have an appeal for users and should be analyzed by professional services firms.

EXHIBIT IV-10

Technology-Related Factors That Could Increase Usage of Professional Services

Factor	Average Rating of User Interest*
Aid in expanding or integrating network capabilities	4.1
Aid with data base integration/improvement	3.6
Aid in introducing client-server applications and/or segmentation of application systems between PCs/workstations and larger computing systems	3.5
Introduction/expansion of CASE use	3.1
Aid in planning/implementing downsizing	3.1
Aid in system and IT planning	2.8
Aid in utilizing open systems	2.4

*Note: Where 5 = high and 1 = low

Users have more options in obtaining professional services today:

- Not only are systems integrators offering to engage in professional services jobs that are not part of IS contracts, but software product, turnkey, systems operations, and even processing services vendors are offering to perform professional services work, as illustrated in Exhibit IV-11.

- Several respondents noted that software products vendors had offered to engage in professional services work to customize their large application products.

- The growing number of competitors is affecting the business of most professional services vendors in this tight economy.

EXHIBIT IV-11

Types of Vendors Now Competing for Professional Services Business

Expectation	Average Response*
Professional services	5.0
Software product	3.9
Accountant and general consultant	3.9
SI	3.7
Processing/systems operations	2.4
Companies in related business	1.9
Turnkey	1.6

*Note: Where 5 = high and 1 = low

Systems planning consultants at a large bank and major energy corporation feel that the increased competitive situation has been encouraged by technological as well as economic factors.

- Increased use of PC, client-server, and network technology has stimulated users to seek software products that, with customization, can meet near- or intermediate-term needs in cost control, customer ordering and related services, revenue analysis, purchasing, or other related areas.

- Users who are speculating about ways to cut costs or improve operations are turning to software product vendors, systems software specialists, turnkey firms, and systems integrators with experience manipulating software products when they might only have turned to professional services firms in the past.

The systems planning consultants also feel that discussions about software engineering are encouraging users to anticipate the evolution of software products to meet needs more easily (perhaps, too easily) over a period of time.

The expected increase in usage of professional services during 1991 and from 1991 through 1996 is shown in Exhibit IV-12. Most respondents expect to have a moderate increase, although some large firms expect to have significant increases. An analysis of the data shown suggests that the growth rate in 1991 could be under 10% and the anticipated growth rate through 1996 appears to be between 10% and 11%.

EXHIBIT IV-12

Anticipated Increase in Usage of Professional Services

Anticipated Increase in Usage	Average Confidence Level	
	For 1991	For 1991-1996
15-20%	1	1
10-15%	3	4
0-10%	3	2

However, this growth may be based more on the number of days of work rather than on expenditures. Comments of some respondents suggested that they expected to obtain services at more economic rates due to present levels of competition.

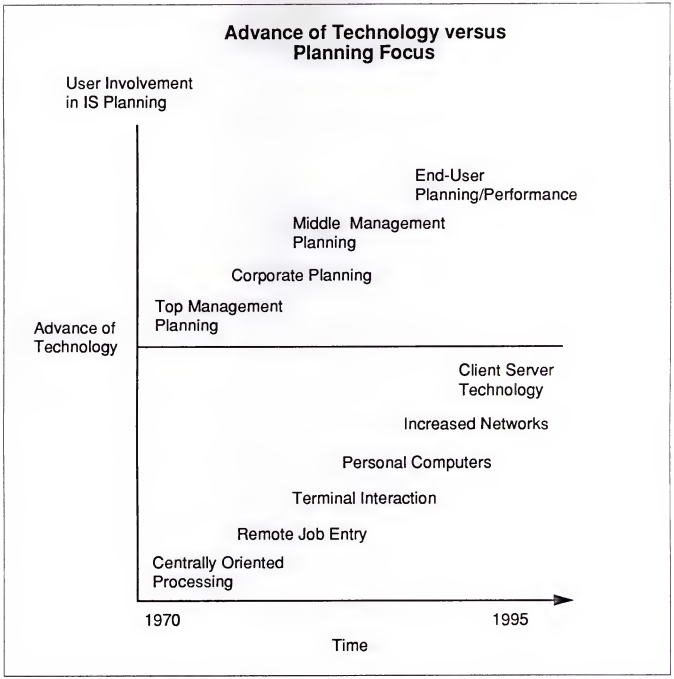
These estimates of growth apply to professional services as a whole in the non-federal government marketplace. Consulting should be growing slightly more rapidly due to increasing management interest in information technology and strategic planning related to the use of IS. Systems development is growing at a rate less than the growth of the professional services market as a whole, and education/training is growing slightly more rapidly than the marketplace.

As noted before, growth in the federal government is lower, and programming assignments are growing more rapidly than consulting or education/training assignments, partially due to budgets as well as congressional pressure on the type of assignments being undertaken.

The use of professional services, in general, is entering a period where end users are having more impact on whether services are used and how they will be used.

- While planning has expanded or extended from top management-oriented activities to end-user-involved functions as shown in Exhibit IV-13, the use of technology has advanced at the same time to provide capabilities that increase the participation and role of end users.

EXHIBIT IV-13



- It is not surprising that end users are exerting more influence on the use of professional services and on the decision making that leads to their use.

Issues and Trends

Issues and Trends

A
Introduction

Since there has been a considerable impact of the economy on the professional services business during 1991, it is necessary to identify and discuss key issues and trends in the information services business before discussing and developing a market forecast for the professional services market and analyzing competition.

Some of the issues and trends discussed below have an impact on the overall IS market. Others relate more specifically to the U.S. professional services market.

1. Key Issues in Information Systems

In response to continued weakness in the economy and sales performance less than plan, corporate management and information systems buyers are chiefly concerned with system improvements that can aid sales activities and improve service or reduce costs, as reflected in Exhibit V-1. A number of companies report that funds to spend on outside professional services assignments have been reduced, particularly for projects that do not address these objectives, making it necessary to seek alternative means of meeting less critical information requirements.

- An information systems planner for a major energy company reported that funds were being spent to investigate and link together CASE tools to handle a number of internal job requests, some of which would have been done with contract programmers in the past.

- Funds were being allocated to perform a much reduced number of jobs by using professional services vendors. The most important job among these was to develop a better means of providing service information for and receiving orders from distributors.

  In addition to illustrating the focus on revenues and service capabilities, the example discussed above showed how professional services work had been reduced through the use of CASE tools by in-house staff.

EXHIBIT V-1

Information Systems—Major Buyer Issues

- Pressure to increase sales and earnings
- Need for improved customer services
- Desire for more rapid system solutions
- Desire for more support of complex system solutions
- Planning the use of technology
- Interest in industry knowledge and experience
- Shortages of certain technical expertise
- Use of larger, more stable vendors or inexpensive contract services

In order by average importance to respondents.

Several large IS vendors have reacted to the focus on revenues and sales by being proactive and approaching large buyers with plans and demonstrations for application systems that can generate additional revenue and improve service. One professional services vendor noted that they can aid with ideas and plans for cost reduction too, but that the emphasis on increasing revenues was much more effective in business development efforts.

Other major buyer issues involve a desire for more rapid development of systems solutions and recognition of the increasing complexity of solutions and the need to coordinate the use of technology.

- The CEO of a large food manufacturer noted with irritation that the company couldn't afford to wait several years for the development of application systems in accordance with the plan his IS staff recommended. He wanted a vendor to come up with rapid modification or integration of existing software products to meet company needs, even if this approach was risky in view of the complexity of the technology and the application systems involved.

- The CEO also wanted the vendor selected for the project to take responsibility for problems that might arise due to technical complexity. Such an assignment broadens the role of the professional services vendor.

In the example discussed above and in other situations reported to INPUT, buyers reported that industry knowledge and experience was sought, to ensure that vendors understood the objectives of important projects that had to be delivered rapidly and/or in a complex environment.

- The ability to demonstrate industry knowledge through presentations or demonstrations provides an advantage for larger vendors who can afford to finance these capabilities.

- Users report that some smaller vendors have been able to demonstrate industry knowledge obtained through assignments or recruitment.

- Smaller vendors have also been able to utilize expertise in areas of technical skills where there are shortages as a means of obtaining work and penetrating new accounts. Users report that smaller vendors have utilized knowledge in networking applications, data base integration and C language programming, among other capabilities.

Some buyers report, however, that they feel an issue is arising in the selection of vendors that involves using larger vendors with experience in many areas of technology and industries for larger and/or critical projects, and using inexpensive contract services for other assignments, providing these firms demonstrate that they can supply adequate personnel.

- This has led to greater use of the "agency"-like contract services that can provide one or more people even for short assignments.

- These firms now have comprehensive files of self employed systems technicians, as well as many people looking for new jobs who will take short-term assignments while engaged in a job search.

- Recent cuts in IS personnel, which number in the tens of thousands on a national basis, have provide many good candidates for the "agency" types of firms that report sizable increases in the number of personnel represented and the number of assignments handled.

2. Professional Services Vendor Issues

Greater use of "agency"-type contract service firms as discussed at the end of the last section illustrates one factor involved in the increasing level of competition.

Means of penetrating accounts and the high level of competition are two of the vendor issues discussed most frequently, as shown in Exhibit V-2. Not only does the number of professional services firms keep increasing, but the number of client firms is relatively constant. In addition, firms in other delivery modes of the information services industry are competing for professional services business.

- Professional services vendors report that SI firms with contacts or work at a client are competing for standalone jobs that would have gone to professional services vendors in the past. Some SI firms have become more interested in these jobs because larger, more complex jobs are not available or are being deferred.

- Several users report that applications software product vendors have told them that they would be offering products with CASE capabilities that would enable them to handle many modifications or enhancements in the future, more rapidly, at less cost, and with the involvement of no other vendors. This work may not add up to a substantial volume of revenue, of course, but it could lead to some work and encourage users to handle more modifications and enhancements by themselves or use software vendors to perform the professional services work.

- Turnkey vendors have also been offering to modify software products with which they are familiar, to meet user needs.

EXHIBIT V-2

Professional Services—Major Vendor Issues

- More sources of competition
- Means of penetrating accounts
- Growing importance of consulting skills
- Need for knowledge of industry markets
- More use of existing applications software systems
- Use of alliances and joint arrangements
- Shortages of certain technical skills
- Need to implement solutions more rapidly
- Strategies for obtaining additional business

In order by average importance to respondents.

The increased competition has led many professional services vendors to concentrate more on consulting skills, industry knowledge, and alliances and joint arrangements with other firms, as suggested in Exhibit V-2. The alliances can help to provide industry or technical strength or additional market contacts.

These tactics, particularly consulting, can provide more market opportunities and may enable professional services vendors to build confidence with prospects while examining business needs and problems that might not be solved in the rush to implement a solution.

However, in a number of situations, vendors have found that they need to be able to implement solutions more rapidly, which could require more skills in CASE as well as experience in reusing or working with large applications software systems, according to a very large IS vendor.

The combination of capabilities and/or areas of work that offers opportunity at this time is an important issue for a number of vendors, as reported in Exhibit V-2.

- Several vendors report that an SI initiative is a strategy for obtaining professional services work as well as some SI jobs. One midsized vendor reports that it bids on SI jobs with the intention of impressing the prospect enough to obtain contracts for personnel to work on the large jobs for which vendors are being evaluated, even if it is not chosen as the prime contractor or chief vendor. This firm anticipates and identifies the skills the job will require and makes sure that the prospect knows that it has personnel with these capabilities.

- Some vendors are exploring strategies for obtaining work by supplying enhancement and maintenance for application systems. An issue of *American Banker* during the past year noted that a professional services vendor was supplying ongoing support to key applications software systems at two major banks.

The type of work mentioned abov—applications maintenance—has been supplied previously in conjunction with processing services and systems operation as a packaged service. It responds to increasing user demand for aid with complex applications systems and will be a growing component of professional services.

There is general interest among IS vendors in outsourcing application development and support.

- Vendors such as IBM, EDS, CSC and DEC who are outsourcing all the information systems work of an information systems department or of functional departments within corporations are approaching this opportunity from a perspective that may be too large-scale for many corporations.

- This could provide opportunities for other vendors, who could provide smaller, more tolerable levels of outsourcing to an information systems department or corporation by taking over the maintenance (and, possibly, enhancement) of selected application systems.

Applications maintenance and enhancement can be attractive to vendors and buyers because it can be tried out on selected systems and then extended to others. Professional services firms can use their resources of personnel skills as required to support work.

B

Key Information Systems Trends for the 1990s

1. Changing Role of Professional Services

Professional services were used in the 1960s and 1970s primarily to develop new applications software systems for users and to support the sale of computing equipment by developing and modifying applications software products so that they would more closely meet the needs of customers of hardware vendors. By the mid-1970s, professional services vendors were also supplying personnel to users and computer manufacturers to help them with software products.

In the 1980s, the use of applications software products increased in importance, and computer manufacturers made a number of arrangements with vendors of applications software products that were attractive to users due to capabilities, features, performance or pricing. The changing importance of applications software products affected the use of professional services in several major ways.

- Vendors began to supply increasing numbers of contract personnel with expertise in popular applications software packages to users as well as to vendors of hardware.

- Vendors of professional services initiated activity based on the integration of applications software products and other hardware and services that was eventually recognized as a separate delivery mode—systems integration—by INPUT and other industry experts.

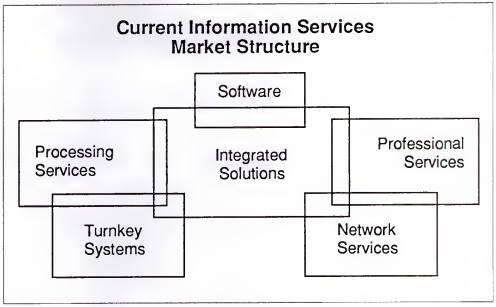
- Some applications software product vendors began to offer professional services. For example, Oracle used these services to speed growth.

The information services market has now changed from one in which software played a central role, as in the 1980s, to one in which the central role is being played by integrated solutions, as shown in Exhibit V-3.

- Users' needs are being met through integrated solutions in which a vendor with industry and applications knowledge is playing a lead role.

- When users are buying applications software products, turnkey systems, computer hardware or professional services from one or many vendors, one vendor may play a key role as the primary integrator based on its ability to supply the support services and industry expertise required for integration.

EXHIBIT V-3



The ability to provide support services, including professional services consulting and project management, together with industry expertise will provide vendors (SI, professional services or other types) the opportunity to expand assignments and to control or recommend the use of vendors in other information services delivery modes.

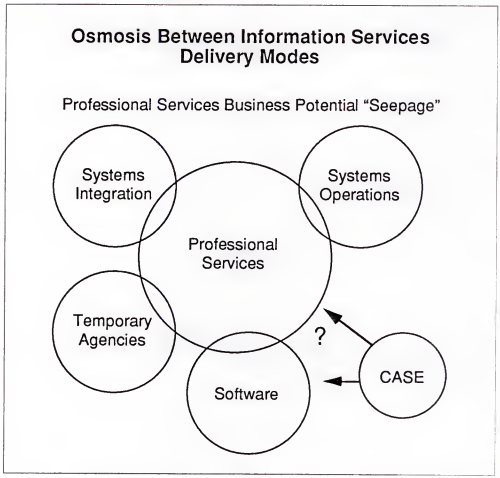
The situation just described is one in which vendors of one information services mode can find it possible and attractive to offer services of another mode. This can lead to the intrusion of one mode into another, as illustrated in Exhibit V-4.

A leading question is what new directions may be taken by vendors of professional services. The development of new application systems has fallen in volume, and competition from low-cost personnel firms and vendors of other IS modes has eaten into contract personnel business.

- The growth of contract business in some geographical areas, including Boston and New York City, fell to zero during the first four to five months of 1991, according to a number of respondents.

- Several banks reported that they had cut back contract personnel drastically and were only using very low-cost sources.

EXHIBIT V-4



In answer to the question of what professional services vendors will do in this situation, contacts with vendors and knowledge of their initiatives leads INPUT to the conclusion that trends in future professional services business will include:

- The provision of enhancement and maintenance support for user application systems. Many of these jobs may be attractive, but a number will be more costly to perform than vendors anticipate, according to a major vendor who pointed out that the size of a system being maintained (in lines of code for example) can increase by an order of magnitude in a ten-year period.

- Obtaining assignments based on being prepared to support large SI or professional services vendors (having the industry knowledge and/or technical skills required) for certain industries, and willingness to be used as a subcontractor.

- Some smaller vendors will provide expertise with certain sets of skills such as networking or the use of CASE, or develop depth of knowledge of an area(s) in one industry.

- Use of a partnering relationship with a larger vendor as a means of penetrating companies. A number of small vendors, including CGS in New York, have used partnering with IBM and other vendors as a means of obtaining additional work. CGS uses support for the AS/400 and training in OS/2 and LAN Manager as means of penetrating accounts to market development or contract services.

Contract personnel will continue to be supplied by many vendors, particularly by the new "agency" firms.

- These firms will use tactics such as supplying only one or two people on a short-term basis and supplying people at a small mark-up of the rate of compensation they desire. They will become the low-cost providers.

- Very little added value or no services are included. For instance, an evaluation of skills may be done by putting responsibility on the candidate, noting that it can hurt the candidate in the marketplace as well as the "agency" if job skills are overstated.

It can be very difficult for established professional services vendors—that offer contract services with added values such as evaluating and training candidates—to compete with these low-price vendors.

These low-cost agencies are also exploring other opportunities. One innovative vendor that supplies low cost contract services is also marketing application system support where it can obtain longer assignments that use more people.

2. Continuing International Expansion of the IS Market

The trend for the sale and use of information services on an international basis is continuing to grow. The interest in foreign markets, the 1992 EEC agreement, diminishing trade barriers between the U.S. and other North American countries, and international mergers and acquisitions have all continued to stimulate business. This business presents opportunities for new and faster growing sources of revenue, but also requires recognition of the challenges and costs required, as suggested in Exhibit V-5.

Many of the opportunities in these markets will be driven by experience in the U.S. market.

- Similar needs are being encountered in international markets.

- Many clients are multinationals with offices in the U.S.

- Many trends, such as increasing need for support, greater participation of end users in systems design and use, and expanding use of networks and client/server technology, are present in the international environment.

EXHIBIT V-5

Impact of International Opportunities

- Opportunities in foreign markets
- Higher growth rates for information services in foreign markets
- Internationalization of requirements
- Costs of international business
- Demand for time-sensitive solutions
- More emphasis on support

In order by average importance to respondents.

A number of information services firms now have international business, and for many of these firms, foreign business is growing more rapidly than domestic business.

Foreign business also has required more investment and work for information services firms: the inclusion of international specifications and support for international communications facilities and protocols, as well as for pre- and post-sales support of services in foreign countries. Specifications and support work may have to take account of time differences between countries as well as markedly different business conventions.

C
Professional Services Market—Driving Forces

User pressures to increase revenues and earnings and to improve services to customers that can stimulate revenues are a major driving force in the professional services market, as indicated in Exhibit V-6. Users report that this pressure is encouraging interest in upgrading, improving and even replacing order entry, sales analysis and accounting systems, as well as systems to implement JIT inventory, EDI and manufacturing capabilities that can improve products or reduce costs.

Although the reduction of backlogs continues to be a driving force in itself, the pressure to increase revenues and earnings is at a level where top management in many companies are looking for programs to achieve this objective and are interested in listening to consultants who can demonstrate or discuss what can be done.

EXHIBIT V-6

Professional Services Market Driving Forces

- Pressures to upgrade order entry and key sales and productions systems
- Ongoing need to handle backlogs
- Need for high level of consulting services
- Growing importance of industry knowledge
- Growth of network use
- Need for rapid delivery of application solutions
- Trend to expand professional services to support:
  - Application maintenance/enhancement
  - Application reuse
  - Application management

In order by average importance to respondents.

- A bank that had reduced the use of contract personnel drastically and delayed the work of an information services vendor on an important development project engaged a major professional services firm to provide higher level consulting that would lead to large-scale development activities.

- Top management at a process manufacturer hired a professional services vendor to carry out expensive consulting work that would lead to major development activities—without the participation or concurrence of the CIO.

The perceived or real need for high-level consulting services combined with industrial knowledge is one of the major forces in the professional services market. Several major vendors feel that this is a very real need, and it favors use of larger vendors that can afford to maintain such capabilities.

The need for rapid delivery of application solutions is also continuous, although the growing complexity of systems and the desire to obtain consulting aid to plan systems activities tends to increase the scope of rapid systems development in many cases.

One of the largest information services vendors, who noted that his firm had upgraded and improved major applications at clients for over a decade, felt that it was necessary to have the skills for speeding up implementation, but it was also necessary to have the skills to examine and present arguments to the user regarding the complexity and new problems that data base or network integration or other tasks could involve.

The growth of network use is also a driving force in the professional services market. For many application systems being developed or upgraded, the use of network capabilities is one of the most critical or significant factors of the system. Several major vendors have collected information on network vendors that they might consider using in the future.

- Connections between distributed company functions have become a major consideration, according to a large energy company.

- Respondents report that connections to other companies are required to enter orders, receive information about the status of orders, or implement EDI. One respondent noted that communications would become even more complex for several application systems when imaging was introduced, and vendors with relevant experience were being sought.

As Exhibit V-6 also indicates, there is a trend to expand the use of professional services to support and improve existing applications. The buyer issues regarding aid with maintenance and enhancement that were discussed and vendor initiatives to provide services for supporting, managing and reusing applications will lead to a major trend in the professional services market.

- Professional services vendors will have departments and/or activities devoted to application support.

- Consulting and aid with CASE tools and re-engineering of applications may be handled by these departments.

D
Professional Services Market—Growth Inhibitors

As indicated in Exhibit V-7, one if not the chief growth inhibitor in 1991 was the continuing economic downturn, which kept expenditures for contract personnel services flat during at least the first quarter of the year in some regions of the country. This flatness will continue into 1992.

EXHIBIT V-7

Professional Services Market Growth Inhibitors

- Delayed economic recovery
- Tight budget
- Competition from other types of vendors
- Shortages of certain technical skills
- Reduced importance of some objectives

In order by average importance to respondents.

- Several respondents also noted that they had delayed vendor assignments on projects as a result of continuing economic problems.

- Several of the largest IS vendors who were contacted stated that their business with large development projects was less affected, although one admitted that expansions in service in some new offices had not proved to be successful.

Many vendors report that tight budgets have continued to be an inhibitor to growth through 1991, but some professional services vendors have discovered larger budgets in other departments of prospects, particularly end user offices, and have tried new strategies for seeking business.

Shortage of key technical skills was mentioned as an inhibitor to business by a few vendors, who mentioned delays in obtaining personnel with network integration, CASE, specialized data base tool and other capabilities as reasons for suffering delays in obtaining work or for losing jobs.

Competition from other information services delivery modes was reported to be an inhibitor to growth also. Large systems integration vendors, as well as software and turnkey vendors, were bidding for standalone systems work that only professional services firms had bid for in the past.

Increased interest of prospects in exploring the use of systems integration or outsourcing has also had an inhibiting effect on professional services. The same or even more work may be done by vendors, but it will not be counted in the professional services mode and the vendors who expected the work will not receive it.

- A midsized bank recently decided to use a large outsourcing vendor. This resulted in cuts in work for three professional services vendors. These vendors feel that the total amount of contract work has decreased, not that it has been moved to a different type of vendor.

- At two large corporations, projects that will involve consulting and then the use of professional services were initiated but not officially reported to the IS department. Professional services vendors serving those corporations again thought work had been canceled, not that it would be done by vendors specializing in management consulting who might eventually bring in other vendors.

In view of the above comments and the expanded work of "agency" vendors, it can be difficult for vendors who serve certain industries or who are in certain geographic areas to assess what is happening to business in the market.

The increased power of application development tools that are used by in-house development staffs or by vendors can inhibit growth as well.

- As mentioned before, several software product vendors have begun to promote the use of CASE tools as a means of modifying or enhancing their products to meet user needs instead of having professional services vendors do it.

- Users report that they have also used CASE tools to accomplish work that might have been performed by professional services vendors.

Several major corporations that have used CASE tools to replace development or modification work that would have been done by in-house staff or vendors note that they have used professional services vendors to aid them in the use of these products. One user said that the use of these tools will force vendors to obtain personnel with higher level skills who can address the data base and network integration problems and complex new applications with which corporations are being confronted. This suggests that the use of CASE tools and methodologies may stimulate the growth of specialized professional services or vendor departments.

E
Information Services That Utilize Professional Services

There are recognizable professional services components to systems integration and turnkey systems, as shown in Exhibit V-8, as well as professional services work that may be supplied with outsourcing of operational work, customer services and management consulting.

The professional services content of systems integration includes planning, managing and implementing a solution on the equipment or facilities required, in addition to the systems management responsibility which involves overall responsibility for the project. (See the INPUT report *U.S. Systems Integration Market, 1991-1996* for further information on this subject.)

The outsourcing of operations may require professional services activity to enable customer work to run on upgraded equipment, different networks or on an upgraded or different operating software product, or even to utilize an upgraded or different application product(s). This professional services work may not be reported separately.

Customer services work of a professional services nature that also may not be counted includes planning, consulting, training, coordination and management activities.

EXHIBIT V-8

Contrasts Between Professional Services and Related Delivery Modes

Category	Professional Services	Systems Integration	Turnkey
Project duration	Can be continuous	Limited	Limited
Project management responsibility	Usually customer	Prime contractor	Vendor
Computer equipment selection	Customer	Prime contractor for customer	Vendor for customer, usually
Services provided	Often a single service (e.g., software development)	Usually multiservice, including hardware/ software integration	Multiservice, but usually hardware, software and prof. service
Pricing	Time and materials	Fixed-price	Fixed-price
Item purchased	Resources	A solution	A solution

Market Forecast

Market Forecast

A
Market Overview

The professional services market is in a period of substantial change.

- The separation of systems integration and systems operations services (facility management) from the market has led to restructuring of activities by a number of vendors and a diversion of resources to these new modes.
- The economic downturn and protracted recovery have led to a re-evaluation of the use of professional services as well.

The changes are illustrated in Exhibit VI-1 which indicates differences in the outlook of the market between 1990 and 1991.

- The forecast for user expenditures in 1990 of $16.8 billion was equal to the actual expenditures in 1990.
- INPUT has adjusted the forecast made in 1990 for user expenditures in 1991 downward, however, from $18.5 billion to $17.8 billion and has also developed a five-year forecast of 9% that is 3% lower than the previous forecast.

The downward revisions in forecasts shown in Exhibit VI-1 are due mostly to the protracted economic downturn and delayed recovery, but the removal of systems operations from professional services and reclassification of some systems development work as systems integration also had an impact.

EXHIBIT VI-1

Professional Services Market Overview ($ Billions)

1990 Outlook		1991 Outlook
1990 Forecast - 16.8	versus	1990 Actual - 16.8
1991 Forecast - 18.5	versus	1991 Forecast - 17.8
1990-1995 Forecast Growth Rate - 12%	versus	1991-1996 Forecast Growth Rate - 9%

B

Market Structure

INPUT segments the information services industry into eight delivery modes serving 15 industry sectors and seven cross-industry sectors. The delivery modes are:

- Processing services
- Network services
- Turnkey systems
- Systems software products
- Application software products
- Systems integration
- Professional services
- Systems operations

Although there are over 13 types of vendors serving the market, as illustrated in Exhibit VI-2, INPUT recognizes three submodes of services in the professional services market:

- Software development and maintenance
- Consulting
- Education and training

These segments represent types of services offered in support of the information systems industry rather than generic services. For example, education and training includes services such as computer operations training, management training, and video instruction related to computer usage. In a like manner, consulting services are specific to the information systems needs of customers.

EXHIBIT VI-2

Market Structure Based on Category of Services Provider

There are instances in which professional services firms also market management consulting services not related to information services. CSC designates this work as management consulting. Also, management consulting firms have added on professional services consulting, education and training, and even software development. A group of consulting firms have established professional services departments and subsidiaries.

In prior years, the professional services delivery mode included a fourth segment called systems operations (or facilities management). In 1990, INPUT made systems operations a separate delivery mode, combining the systems operations (facilities management) segments from professional services and processing services.

Exhibit VI-2 indicates the different types of firms that are participating in the professional services market. This market can be divided or structured based on the category of service provider. That type of structure places professional services firms into one of three categories:

- Product-based (computer hardware, software, communications products)
- Core service-based(professional services is a principal line of business)
- Newer service-based

Core service-based firms are the industry pioneers, some having offered professional services since the late 1950s. Although the public accounting firm Arthur Andersen & Company (now Andersen Consulting) has been a key player in professional services since the mid-1950s, the newer service-based firms generally did not enter the professional services market until the 1960s or 1970s. Product-based firms, which sell primarily computer hardware or other products, entered the professional services market between 1965 and 1984. IBM, with its early emphasis on customer service and support, helped build the market for professional services.

C

Professional Services Market

1. Market Analysis

This market is marked by sharp differentiations of success by activities within submodes as well as within geographical areas and industries. For example, contract service portions of submodes in the New York region and Boston suffered a flat first quarter and low growth altogether in 1991, mostly due to the economic downturn but also due to increased and intensified competition, particularly from the newer "agency" type of contract services firm.

The economic condition has a significant impact on the use of professional services since they can be delayed or reduced after start up; whereas the use of other information services such as software or turnkey products

cannot be reduced once purchased, and it is harder to reduce processing services or systems operations once initiated. For this reason, it is useful to review the GNP and inflation assumptions utilized by INPUT, shown in Exhibit VI-3.

EXHIBIT VI-3

U.S. GNP and Inflation Growth Assumptions 1990-1996

1990 Report Assumptions*

Overall Economy	1990E	1991E	1992E	1993E	1994E	1995E	1996E
Nominal GNP	5.4	5.4	6.7	6.7	6.7	6.5	6.4
GNP Deflator	4.4	4.6	4.1	4.0	4.0	3.9	3.8
Real GNP	1.0	0.8	2.6	2.7	2.7	2.5	2.6

1991 Report Assumptions**

Overall Economy	1990A	1991E	1992E	1993E	1994E	1995E	1996E
Nominal GNP	5.0	3.8	6.3	6.7	6.5	6.0	6.2
GNP Deflator	4.1	3.9	3.6	3.9	3.9	3.8	3.7
Real GNP	0.9	(0.1)	2.7	2.8	2.6	2.2	2.5

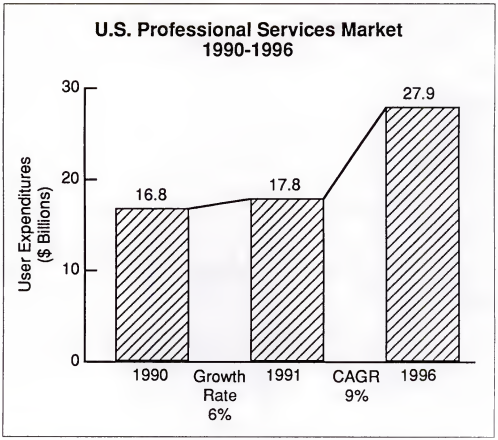
Source: CONSENSUS™ forecast, Blue Chip Economic Indicators

* Blue Chip Economic Indicators - Vol. 15, No. 10, October 10, 1990

** Blue Chip Economic Indicators - 1991-1992 from Vol. 16, No. 7, July 10, 1990
- 1993-1996 from Vol. 16, No. 3, March 10, 1990

Primarily due to the impact of the economic downturn, the professional services market grew at a drastically slower rate (practically flat for the first four months of the year), from a 1990 user expenditure level of $16.8 billion to a 1991 level of $17.8 billion, representing an annual growth rate of 6%. Over the five-year forecast period shown in Exhibit VI-4, professional services will grow at a 9% CAGR, reaching $27.9 billion in 1996.

EXHIBIT VI-4



INPUT had anticipated a slight drop in growth rate to 10% during 1991 but the rate fell sharply, to 6%, and INPUT now estimates that growth will be slower through 1996. INPUT's forecast for the 1991-1996 period is lower at 9% than its previous forecast of 12% for 1990 to 1995. The decrease in growth rate is due primarily to the following:

- The movement or reclassification of some professional services engagements to more complex systems integration projects, or the absorption and lack of recognition of professional services work required to support outsourcing to a systems operation firm.

- The delay or cutback in systems development projects resulting from impacts of the economic downturn and other negative business factors in some industries, which reached their greatest force during the first quarter of 1991 when contract business in some geographic regions fell drastically.

- The removal of the systems operations (facilities management) subsegment from professional services. It was growing and will grow measurably faster than the three submodes that now make up professional services, although it only amounts to 10% of professional services at present.

Continuing growth in professional services is due to the pressure on users to implement and enhance applications systems that are critical in order to increase revenues or services or reduce significant costs. These applications systems can require experience and skills which may not be available within an organization when needed, so outside services must be used. This is in line with the increasing drive to outsource which will lead to outsourcing of application support including enhancement and maintenance.

Additionally, organizations may choose to maintain a work force below peak levels needed to implement and enhance applications and rely on professional services firms during peak periods.

Professional services vendors can provide unique skills and experience necessary for problem solving. As a result of their independence, vendors can provide or support alternative solutions to industry-specific problems.

In addition to offering aid with the analysis of business planning related to current and strategic systems issues, professional services consulting helps users select from the myriad of applications software or turnkey systems available to satisfy the user's needs. Professional services firms attempt to make impartial recommendations in the selection process. By contrast, a consultant from a software products or turnkey systems company that offers a certain type of solution will attempt to promote that product.

If applications plans and needs become more complex, users hire professional services firms based on their sophisticated development skills or experience in developing complex applications systems. Their ability to perform specialized, one-time services such as supplying a particular application module or software conversion from one hardware platform to another represents substantial added value. The use of an outside service prevents hiring staff that is needed for only a limited time.

2. User Expenditures by Industry

In 1991, users will have spent about $17.8 billion for professional services, spread across 15 industry sectors. These expenditures, by industry, are shown in Exhibit VI-5.

In 1990, spending for professional services by the six leading industries accounted for over 84% of total user expenditures. The top six industries are, in order:

- Discrete manufacturing
- State and local government
- Banking and finance
- Process manufacturing
- Federal government
- Insurance

EXHIBIT VI-5

Professional Services User Expenditures by Industry, 1991-1996

Industry Sector	User Expenditures ($ Millions) 1991	1996	1991-1996 CAGR (Percent)
Discrete Manufacturing	4,459	6,705	9
Process Manufacturing	2,119	3,336	10
Transportation	233	333	7
Utilities	249	359	8
Telecommunications	1,098	2,226	15
Retail Distribution	220	292	6
Wholesale Distribution	351	465	6
Banking and Finance	2,184	2,880	6
Insurance	1,532	2,305	9
Medical	272	411	9
Education	82	128	10
Business Services	304	417	7
Federal Government	1,900	2,700	7
State and Local Government	2,638	5,167	14
Miscellaneous Industries	116	168	8
Total	17,757	27,892	9

By 1996, process manufacturing will be larger than banking and finance.

Several factors contributed to the current spending levels in the key industries:

- Driven by the need to become more competitive, discrete manufacturers continue to spend heavily to automate production processes and materials management/distribution functions, improve the network infrastructure, and improve order entry processes. The heaviest expenditures are for software development. Consulting expenditures and the use of systems integration in this industry grew in 1990 and 1991.

- Despite economic problems, state and local governments in general expanded network and computing capabilities and implemented new eligibility and emergency response applications as well as other accounting, revenue collection, and health and human services applications. Professional services firms were also hired to perform software consulting to protect the investment in existing applications software. Since state and local governments must operate on a pay-as-you-go basis, these organizations are major users of systems operations contracts.

- Although the federal government has sizable contracts to replace second generation computer systems in accounting and finance, logistics, and personnel systems, work has slowed due to reductions in Defense Department and other expenditures. Systems integration, as well as professional services contracts, have been utilized to upgrade applications to achieve improved effectiveness. The use of consulting has decreased in relation to software development due to the bias of Congress against this type of work, which often utilizes the expertise of ex-employees.

- Consolidation, deregulation, and internationalization in the banking and finance markets created opportunities for professional services firms offering software development and consulting, although systems integration and outsourcing by systems operations firms took advantage of some of these opportunities. Steps to reduce operational costs have also led to ongoing use of professional services in the banking and finance industry as well as major shifts to systems operations. The challenges facing the industry are creating significant economic pressures, which resulted in much slower growth in 1990 (estimated at 5%) than in previous years.

- Processing manufacturing, driven by the ongoing need to reduce costs, continued to re-automate its production processes. Process manufacturing companies are also modifying their information systems to yield more customer and marketing data. Information systems upgrades are necessitating extensive investments in skills upgrades for professional staff. Professional services expenditures in process manufacturing include software development, education and training, and consulting.

3. Expenditures by Functional Area

Users' professional services expenditures were concentrated in the following four functional areas in 1990:

- Manufacturing/business operations
- Accounting/administration (including order entry, customer services, office systems)
- Data processing/telecommunications
- Logistics/physical distribution

Expenditures for professional services in manufacturing/operations and accounting/administration (shown in Exhibit VI-6) account for over 51% of the 1990 total.

EXHIBIT VI-6

Professional Services Expenditures by Functional Area, 1990

Functional Area	Expenditures ($ Billions)	Percent of Total
Manufacturing/ Business Operations	4.7	28
Accounting/ Administration/ Office Operations	3.8	23
Data Processing/ Telecommunications	2.7	16
Logistics/Distribution	2.2	13
Research and Development	1.5	9
Sales and Marketing	1.2	7
Human Resources	0.2	1
Other	0.5	3
Total	16.8	100

The manufacturing and operations area encompasses diverse professional services activities such as upgrading systems for computer-integrated manufacturing, just-in-time inventory, airline reservations, railroad management and hospital/laboratory management.

Expenditures in accounting and administration are spurred by the rapid implementation of systems that increase earnings and reduce costs such as electronic data interchange (EDI) services. INPUT divides EDI-related professional services into two categories: front-end and back-end.

Front-end EDI professional services include the consulting and software modification necessary to implement EDI services. Back-end EDI professional services, chiefly software modification, result from the need to modify existing software products or to purchase and modify new accounting and finance software products to utilize EDI capabilities fully.

4. Expenditures by Customer Size

1990 user expenditures are divided in Exhibit VI-7 by the size of customer. Customer sizing information is influenced by data published in *The U.S. Industrial Outlook and Sales and Marketing Management* magazine.

Large users controlled 55% of 1990 information systems expenditures for professional services, compared to 54% of 1989 expenditures. Larger organizations are increasing expenditures on a relative basis. Midsized organizations, however, represent relatively significant expenditures in the federal government, discrete manufacturing, and processing manufacturing sectors. Midsized banks control a greater share of professional services than large banks. Please refer to INPUT's *Definition of Terms* (a separate volume) for definitions of industry sectors.

EXHIBIT VI-7

U.S. Professional Services Expenditures by Organization Size, 1990

Industry Sector	1990 User Expenditures ($ Millions)			
	Small	Medium	Large	Total
Discrete Manufacturing	498	1,037	2,628	4,163
Process Manufacturing	253	648	1,076	1,977
Transportation	43	55	115	213
Utilities	37	84	112	233
Telecommunications	502	NA*	448	950
Retail Distribution	17	40	150	207
Wholesale Distribution	70	127	130	327
Banking and Finance	280	1,123	641	2,044
Insurance	280	490	664	1,434
Medical	30	84	140	254
Education	7	24	45	76
Business Services	41	66	177	284
Federal Government	312	724	1,100	2,136
State and Local Government	181	361	1,820	2,362
Miscellaneous Industries	21	29	54	104
Total	2,572	4,892	9,300	16,764

*INPUT divides telecommunications into large (10 RBOCs, MCI, Sprint AT&T) and small (1,880 local telco carriers).

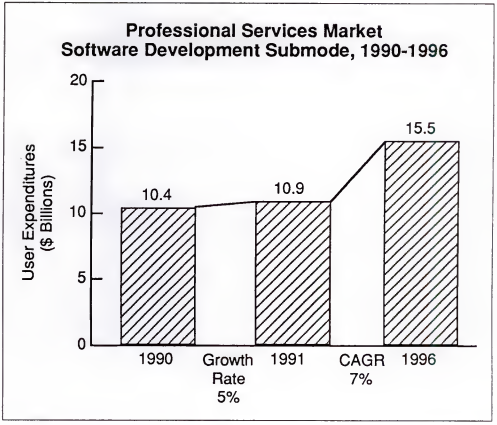
D

Forecast by Submode

1. Software Development Submode

In 1990, user expenditures for software development were about $10.4 billion, making this segment the largest of the three professional services submodes. It is expected to grow 5% in 1991 to $10.9 billion (see Exhibit VI-8), and will increase at a CAGR of 7% through 1996.

EXHIBIT VI-8



The growth rates are below last year's forecasts for a number of reasons:

- Lower priced ("agency") providers are reducing the revenues that result from some software development.
- SI vendors will bid to include more separate standalone software development jobs in SI contracts, thereby reducing software development work by professional services firms.
- Turnkey vendors will expand their bidding on jobs that will not involve the supply of equipment.
- Software product vendors will expand software modification and enhancement work through the use of CASE and 4GL tools.

- More enhancement of application systems will be done by in-house staffs through the use of CASE tools with consulting aid from professional services vendors. Software development work by vendors will be reduced.

INPUT's definition of software development includes the following services:

- User requirements definition
- Systems design
- Data base design
- Programming
- Testing
- System modification and maintenance
- Documentation/technical writing
- System conversion
- Network development
- Other services

Software development is driven, in general, by the ongoing need to make application systems more responsive to business needs as well as to utilize new technologies in hardware and telecommunications, new generations of software products, and increasing purchases of information systems capabilities by organizations of all sizes. It is also strongly driven by the need to integrate networks, applications, and data bases.

Hardware vendors' introductions and upgrading of central processors mean more business for professional services firms. Series of product introductions, such as IBM's AS/400, RS6000 and ESA, Digital Equipment Corp.'s VAX 9000 mainframe, and new workstations from a number of vendors have led to software conversion business as users develop new applications or modify existing software.

The IS vendors that develop software products do not always use the benefits of new technologies such as higher density disk and tape storage drives, relational data base management software, 4GLs, optical disks, optical scanners, integrated voice/data products, and computer-assisted software engineering (CASE). Professional services vendors tend to support these technologies as well as convert existing user application systems in order to use these technologies. However, some software product vendors are now taking more advantage of opportunities to supply professional services to enhance use of their products. This should continue, particularly by making use of CASE methodology.

Small businesses converting from manual methods or processing services to in-house PCs or minicomputers also require software development. There are vendors who support set-up and customization of newly purchased software for small users. Some will modify accounting and other PC packages to support market needs of smaller firms.

Vendors now report that software modification is becoming an important component of custom software development.

- About 54% of expenditures for software development activities can be classified as software product customization and enhancement of in-house systems, and this percentage will rise to over 68% by 1996, as shown in Exhibit VI-9.

- There is increasing interest among professional services and SI vendors in developing new business initiatives to support existing software systems and supply enhancements and maintenance for them.

EXHIBIT VI-9

Software Development Categories

Categories	1991 (Percent)	1996 (Percent)
New Development	40	25
Vendor Software Product Customization	12	15
Enhancement of In-house Systems	42	53
Maintenance	6	7

The industries most heavily utilizing software development services include manufacturing, state and local government, banking and finance, and insurance. Within manufacturing, industrial automation and material handling applications generate significant software development opportunities.

Increasing international business for U.S. manufacturing companies and services vendors means adding specific software features such as ability to handle exchange rates and different currency denominations for purchases and sales; thus, the international aspect provides significant opportunity for software development and consulting.

The trend toward greater use of standards, particularly in network operations, is an additional driving force for software development. Despite the promulgation of numerous sets of standards, standards are missing in software development. Hardware and software vendors imbed proprietary hooks in their products at levels requiring sophisticated knowledge. Custom software development expertise is needed to overcome the advantage of standard products.

2. Consulting Submode

The consulting submode had 1990 user expenditures of $3.9 billion and is forecast to grow 9% in 1991 to $4.2 billion. This growth, plus the forecast of over 13% CAGR to $7.8 billion in 1996, is depicted in Exhibit VI-10. The economic downturn caused a drop in forecast usage in 1991, but the demand for consulting services will cause growth to increase.

According to INPUT's definition, the consulting segment of professional services includes the following:

- Software installation planning
- Information systems audit
- Personnel planning
- Policies and procedures development
- Network planning and design
- Information systems strategic planning
- Systems analysis
- Other

Information technology planning and other consulting revenue has grown as Big Six accounting firms, CSC, IBM, DEC and others have increased their services in this area. In addition, Booz Allen and McKinsey have been emphasizing strategic consulting services which involve reviewing the impact of information systems on business planning and business operations. These firms as well as other consultants concentrating on planning are now increasing professional services consulting assignments.

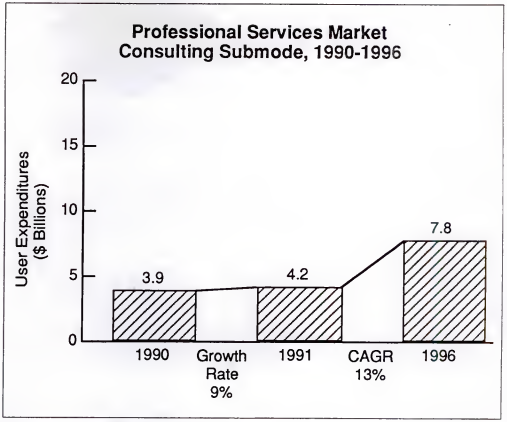
The mounting competition for shares of the growing and profitable consulting market should tend to result in lower prices. Some recent market entrants have used price competition. However, users are more willing to accept high prices for consulting than for other services. They associate the most effective consulting with high-cost suppliers. The growth of the consulting submode is shown in Exhibit VI-10.

In view of the continued strong demand for information technology consulting, INPUT has evaluated the use of consulting services in three categories:

- Processing and network services
- Software consulting
- Information systems change management

Consulting services to analyze and plan opportunities for moving operational work to a processing services or systems operations environment is growing in interest.

EXHIBIT VI-10



Consulting in support of network management services is currently very profitable. The proliferation of LANs, WANs, micro-to-mainframe links, private networks, electronic data interchange (EDI), and ISDN has created strong demand for people knowledgeable in network integration and management.

Software consulting is a broader category, encompassing both systems and applications software, and new techniques for creating/modifying software products. The demand for systems software (and some applications software) consulting is driven partially by distributed processing, downsizing, and workstation technology. Consulting in the applications software area also involves software maintenance. Users everywhere are searching for easier applications software maintenance and enhancement as well as techniques for revising and re-engineering software. Through consulting services, users are better able to select and utilize existing application analysis/design and generation programs and associated methodology and techniques. Though these programs do not solve all of a user's problems, they represent a step in the right direction.

Consulting on the processes leading to creating/modifying software products (software engineering) is a newer area of consulting to users and software product vendors.

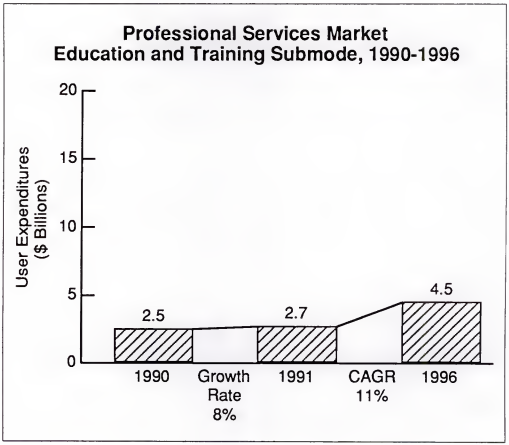
The consulting services activity, information systems change management, describes the process of moving the management of the information systems process from a centralized, impersonal organization to one that provides more interaction and control by end users. This new focus includes increased user support and training.

Industries with the greatest need for consulting services are manufacturing, banking and finance, insurance, telecommunications, and state and local government.

3. Education and Training Submode

Education and training, at $2.5 billion in 1991, is the smallest segment of the professional services delivery mode, amounting to about 11% of professional services revenue. This number represents only external user expenditures for such services; monies spent for internal training are not reflected in the figures. The education and training submode will grow 8% in 1991 and at a CAGR of 11% from 1991-1996, reaching $4.5 billion in 1996, as illustrated in Exhibit VI-11. The rate for 1991 is below the previous estimate due to the economic conditions in 1991. Growth will resume at previously forecasted levels in 1992.

EXHIBIT VI-11



Although growth fell in the first half of 1991, it has begun to resume due to the steady introduction of more complex application systems and technology use. More sophisticated multimedia and hypertext-based training tools are being introduced. The importance of education and training far exceeds its position based on user expenditures relative to consulting, software development, or even systems operations. It is the foundation upon which information services vendors base plans for continuing work and the means that large commercial, government, and services customers use to upgrade their expertise.

As this segment matures, services are becoming increasingly specialized. Specifically, education and training covers the following types of services:

- Methodology and software engineering
- Systems software
- Hardware platforms
- Technology
- Information systems management

Education and training for software products covers CASE tools, UNIX and open systems, and parallel architecture, as well as vendor products such as CICS, DB2 and Digital's and Oracle's data base management systems.

New hardware platforms force users and software developers to learn the technical ins and outs of these products. IBM's introduction of the AS/400 midrange system and RS6000, and the introduction of new workstations, automatically necessitated training and education for user and developers.

Information systems managers as well as non-IS managers need high-level information on emerging technologies such as imaging systems, robotics, industrial automation, AI, LANs, telecommunications, data communications, and voice/data integration.

Information systems managers require exposure to new methodologies for running the IS department. Education and training is required in order to keep up with changes in project management and software development methodologies.

Higher level training classes once offered only to vendor personnel may now be attended by user personnel as well as vendor personnel.

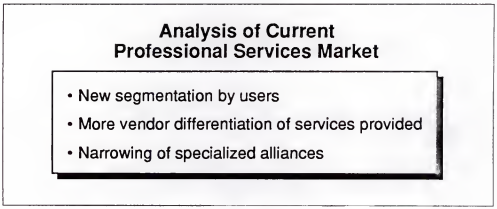
E
Analysis of the Market

Maturation of the professional services market has led to markedly increased competition in addition to the following trends:

- Market segmentation by users in vendor evaluation processes
- Differentiation of vendors that offer proprietary products
- Further development of specialized alliances between hardware and other vendors and professional services firms

The current situation in the professional services market is summarized in Exhibit VI-12. Segmenting the market is one effective way of evaluating professional services activities. While the professional services market can be segmented on the basis of service provider category or vendor capabilities, INPUT has identified three user-based market segments.

EXHIBIT VI-12



Of greatest importance, user firms are segmenting the market based on the size and stability of professional services firms. The largest manufacturing, financial services, insurance, telecommunications, and transportation organizations look to the largest professional services firms for services. These firms' industry knowledge, project management skills, expertise, international experience, proprietary products, and, most importantly, solid financial position ensure that they will receive at least a request for proposal (RFP) to bid on projects. These firms can afford to have in-depth knowledge of more industries as well as more technical skills.

Secondly, users differentiate professional services vendors who offer unique capabilities and those offering traditional services. Some vendors have developed technical expertise in telecommunications and data management, proprietary software for computer-aided software engineering (CASE), and project management as the basis for differentiation and

maintain this differentiation by not selling their products directly to users, but by delivering it as part of an assignment. Some vendors have also developed industry software products which are not sold directly to customers but are used to differentiate professional services.

Another current characteristic of the professional services business is the developing, flexible relationships between hardware vendors and vendors that primarily provide services. In this market segment, hardware vendors team with professional services vendors for one project, then compete vigorously with one another for a different project.

In the next two or three years, many professional services vendors will form stronger alliances with specific hardware vendors and with larger professional services firms. This new marketing approach will result from the increasing level of specialized knowledge required and from smaller services vendors' inability to make a substantial investment in training an internal staff on hardware, systems software products and other new technology.

F

The Contribution of Professional Services to Systems Integration

Systems integration (SI) projects can often depend on professional services consulting as a first phase and can often include all three modes of professional services together with the selection of computer equipment, telecommunications equipment, packaged software, and other services.

Exhibit VI-13 illustrates how the professional services activities listed below can be associated with SI projects:

- Consulting
- Implementation
- Project management
- Project support

Successful SI vendors will develop capabilities in all areas of professional services, either in-house or through alliances with third-party vendors.

EXHIBIT VI-13

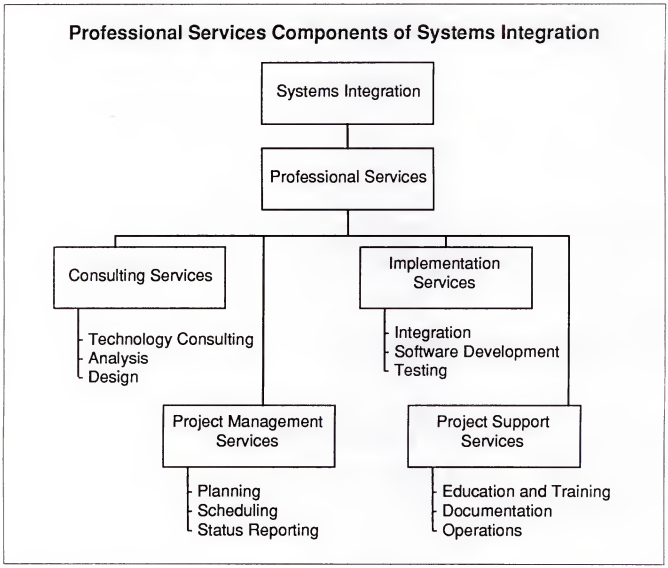
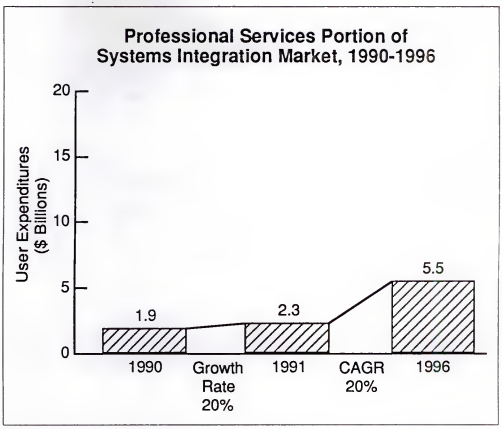


Exhibit VI-14 indicates that expenditures for professional services in systems integration will grow at a 20% compound annual rate through 1996, reaching $5.5 billion. This will amount to about 20% of the professional services market in 1996. Systems integration and regular professional services will be nearly a $33.4 billion combined market in 1996, without including the customization of software products for turnkey systems, which is a third source of professional services as defined by INPUT.

Based on its high value-added characteristic, professional services is the largest and fastest growing component of SI. Consulting services are frequently the precursors of systems integration projects. Overall planning assistance, strategic consulting, feasibility studies, and cost effectiveness trade-off studies help the client to plan for the desired solution.

EXHIBIT VI-14



Work done by the integrator to plan, schedule, and control the materials and human resources for a project represent another use of professional services. Project management (PM) also involves project monitoring and status reporting to the client and risk assumption by the vendor.

Customization of software products, development of new software modules and the conversion of existing software, or the modification of commercial software packages are key professional services in SI. The level of these services varies by industry; however, the leading users are, in order:

- Discrete manufacturing
- State and local government
- Banking and finance

"Walking through" proposed as well as developed systems, providing demonstrations of proposed systems and providing education and training of client staff on the operation of the system and the complete documentation for the project are also critical to the success of an SI project.

Some major projects require that the vendor operate and maintain the developed system for a specified time. This is vendor-staffed, on-site support of the system, or systems operations. Under some contracts, maintenance is under warranty for a defined period, while under other contracts, operations and maintenance is a specifically negotiated arrangement marking the transition of the system from the "prime contractor" vendor to the client.

G

Professional Services Initiatives Through Customer Services

Professional services initiatives in customer services were uncovered by INPUT's Customer Service Program which tracks maintenance and support activities by computer systems manufacturers, software vendors, and independent maintenance vendors.

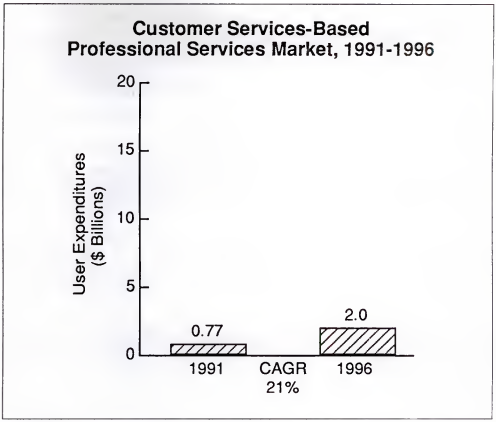
Slowing growth rates in computer hardware maintenance revenues because of improving product reliability, increased competition, and increased pressure from users to reduce prices have led many service organizations to identify professional services as an important growth market.

Although specific activities may vary among different vendors' offerings in the professional services area, the basic concept defining professional services is that customer services-based professional services is any service performed for a fee that improves the performance of a computer system. INPUT qualifies this definition to include only those services that are appropriately managed or performed by the service organization that affect the system's support requirements or ability to be serviced. Those activities include:

- Planning (environmental, site, and installation)
- Consulting (performance optimization, network planning and design, network implementation, or cabling)
- Training (on the maintenance of the system)
- Relocation and reinstallation
- Site management or multivendor service coordination)

Exhibit VI-15 presents INPUT's forecast for customer services-related professional services. These relatively high growth rates are reasonable, given growing user demand for increased system reliability and availability and increasing user activity in these support areas.

EXHIBIT VI-15



IBM has announced three major professional services offerings that overlap this area to some extent.

- The first, Customized Operational Services (COS), is a series of site management and planning services that include the following:

  - Site readiness services
  - Contractor services
  - Installation management
  - Cabling
  - Data center evaluation and design consulting
  - Relocation planning and management services

  In keeping with the customized nature of professional services, IBM prices COS on a case-by-case basis.

- A second major IBM professional services offering is its Technical Services Management (TSM) program, under which IBM provides multivendor support for users, either subcontracting the service or, at IBM's discretion, offering the third-party service itself.

- A third major offering by IBM is Telecommunications Services Network Support. This offering provides TSM-like multivendor support on a wide range of telecommunications and data communications products. Services range from network problem identification to fix verification from IBM's Network Support Center.

Digital Equipment Corporation announced two multivendor services:

- Enterprise-Wide Services is a comprehensive package of planning, program management, and integrated support services drawing from selected service alliances that Digital expects to sign with leading service vendors.

- DEC's Network Enterprise Management Program serves as a platform for existing network planning and support services, and adds new services resulting from alliances with leading telecommunications vendors.

Hewlett-Packard has also entered the world of multivendor service, introducing its Multivendor Support Operation and a Strategic Partners Program, which is designed to attract OEMs with little or no service presence.

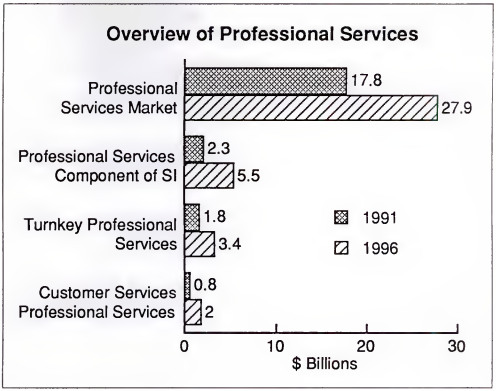
Independent maintenance organizations also recognized the need to compete in the professional services market. CDC's organization introduced an operating system software maintenance planning and management service called Total Operating Performance Package (TOPP).

H

Overall View of Professional Services

Exhibit VI-16 provides an overall summary of professional services revenues in the customer services, turnkey, SI and professional services markets. The overall summary indicates that total use of professional services will grow from $22.7 billion in 1991 to $38.8 billion in 1996 at a CAGR of 11%,which is greater than the CAGR of 9% for the professional services market by itself.

EXHIBIT VI-16



VII

Competition

Competition

A
Introduction

Leading vendors in the U.S. professional services market and certain market segments are identified in this chapter. Professional services defined as information services-related services performed for customers include the following submodes:

- Software development
- Consulting
- Education and training

These services may also be delivered with other capabilities as part of systems integration services or supplied with turnkey systems or newer customer services offerings.

When the concept of systems integration became distinguishable in its focus on delivering solution services and in its different growth rate and marketing methods, it became meaningful to treat SI as separate from professional services.

Another past component of professional services that is now reported separately is facilities management. It was reclassified as part of systems operations since it involves operational processes.

B
Market Leaders

As shown in Exhibit VII-1, the top vendors of professional services in the U.S. include many companies devoted principally to other products and services. The list includes manufacturers of computers, airplanes and other products, public accountants and a phone company subsidiary. Less than 40% of the top firms listed in Exhibit VII-1 are devoted chiefly to professional services.

EXHIBIT VII-1

Largest U.S. Professional Services Vendors, 1990

Rank	Vendor	Professional Services Revenues ($ Millions)
1	IBM	490
2	CSC	475
3	EDS	468
4	Andersen Consulting	310
5	Logicon	221
6	PRC	207
7	CGA	201
8	DEC	195
9	NYNEX/AGS	194
10	CTG	191
11	Unisys	180
12	Ernst & Young	168
13	A.D. Little	165
14	Hewlett-Packard	151
15	Harris Corp.	150
16	NCR	148
17=	Coopers & Lybrand	145
17	CDC	145
19	BDM International	136
20	Grumman	135
21	Applied Learning	105
22	KPMG	104
23	McKinsey	103
24	Computer Data Systems	102
25	Martin Marietta	100

Among the top 25 professional services vendors, computer manufacturers and the providers of public accounting and auditing services stand out.

- IBM, DEC, NCR/ATT, Unisys and Hewlett-Packard can all be found among the top 20 vendors.

- Andersen Consulting, the business organization set up by the partners of Arthur Andersen in view of the size and growth of its non-accounting business, ranks fourth in professional services. Coopers and Lybrand, Ernst & Young, and KPMG also rank in the top 25, and the remaining 2 members of the Big Six, Price Waterhouse and Deloitte & Touche, would also be in the top 25 except for the reclassification of some of their revenue as systems integration related.

IBM, CSC, EDS and Andersen remain entrenched in the top four positions among professional services firms. They each enjoyed more vigorous growth than most other leading firms in this service mode.

- Revenues of the top four firms grew at an average rate of over 18% between 1989 and 1990.

- Three of the six vendors in ranks 5 through 10 of professional services revenue in 1989 grew at a rate under 3% in 1990.

- Only two vendors in positions 5 through 15 had growth in revenue of over 6% in 1990.

Professional services firms continued the trend of expanding services in the systems integration market during 1990, driven by the higher growth rates for systems integration business. Many leading professional services vendors offer systems integration, as illustrated in Exhibit VII-2.

- All of the 10 leading vendors of professional services also offer systems integration services, and most of these vendors have substantial revenues from systems integration. One of the characteristics of leading professional services vendors is their ability to offer systems integration.

- Some vendors announced an entry into the systems integration market in 1990; whereas part of the professional services business of others was reclassified as systems integration during the past year on the basis of the types of contracts they had concluded with clients.

In order to fully compare professional services vendors, it is necessary to compare the sums of their professional services and systems integration revenues, as shown in Exhibit VII-3.

EXHIBIT VII-2

U.S. Professional Services Vendors, 1990
Professional Services and
Systems Integration Revenues

Vendor	$ Millions	
	Professional Services Revenues	Systems Integration Revenues
IBM	490	1,280
CSC	475	441
EDS	468	644
Andersen Consulting	310	686
PRC	207	239
CGA	201	23
DEC	195	525
NYNEX/AGS	194	120
CTG	191	40
Unisys	180	375
Ernst & Young	168	55
Coopers & Lybrand	145	120
CDC	145	151
BDM International	136	40
Grumman	135	185
KPMG	104	100
Martin Marietta	100	376
Oracle	94	49
Deloitte & Touche	90	135
SAIC	60	470
Cincinnati Bell	57	207
AMS	38	123

EXHIBIT VII-3

Ranking of Professional Services Vendors Based on 1990 Revenues

Vendor	Rank in Professional Services	Rank in Professional Services + SI
IBM	1	1
CSC	2	4
EDS	3	2
Andersen Consulting	4	3
Logicon	5	19
PRC	6	9
CGA	7	17
DEC	8	5
NYNEX/AGS	9	11
CTG	10	15
Unisys	11	6
Ernst & Young	12	18
CDC	17	12
Coopers & Lybrand	17	13
Grumman	20	10
KPMG	22	20
Martin Marietta	25	8
Deloitte & Touche	>25	16
SAIC	>25	7
Cincinnati Bell	>25	14

- Some of the firms, including an aerospace firm (Martin Marietta), a computer manufacturer (Unisys), and a public accounting firm (Coopers & Lybrand) have substantially higher rankings in the sums of systems integration and professional services business than they did in the ranking of professional services business alone.

- The top four vendors in professional services alone, however, remain at the head of the list, although a number of others have marked changes in their relative positions.

A group of the top professional services vendors is also expanding systems operations (outsourcing) significantly.

- EDS and Andersen were most closely identified with this work in past years, but the systems operations business of IBM, DEC and other vendors has also grown significantly in the recent past.

- Professional services can be used in some outsourcing to modify and change vendor software products so that client work can be run on a vendor's processing capability. When this is done, the revenues that result from modifying and changing software products should be counted as professional services revenue.

Professional services can also be delivered with systems integration and turnkey systems as well as with certain types of customer services work.

- Revenues for this work are not added back into professional services totals.

- As these modes of information services grow, the percentage of the total professional services work that is handled by other service modes can rise, as illustrated in Exhibit VII-4. These types of work could provide future opportunities for professional services vendors.

EXHIBIT VII-4

Percentages of Total Professional Services Revenues in Other Delivery Modes

	1991		1996	
Delivery Mode	$ Billions	Percent	$ Billions	Percent
Professional Services	17.8	78	27.9	72
Systems Integration	2.3	10	5.5	14
Turnkey Systems	1.8	8	3.4	9
Customer Services	0.8	4	2.0	5
Total	22.7	100	38.8	100

C
Segment Leaders

1. Professional Services Submodes

a. Overview

A list of the leading vendors in each of the three market submodes is shown in the following exhibits. The former submode of professional services facility management has been reclassified as systems operations, since it was operational in nature. An exhibit of leading vendors in this service mode is also included at the end of this section, however, as an aid in market analysis.

b. Software Development

The leading vendors for 1990 in the software development submode, listed in Exhibit VII-5, include only vendors that were among the leaders in the list shown in Exhibit VII-1.

- Leading professional services vendors tend to have a substantial base of services in software development.

- Some vendors show greater relative strength in this submode than in professional services overall, including CSC, CTG and NCR.

c. Consulting Services

In the consulting services submode shown in Exhibit VII-6, the leading vendors included several companies that were not among the overall leaders in the field listed in Exhibit VII-1.

- McKinsey and Booz Allen have concentrated on offering both management consulting services and information services consulting, and they both have been involved in the initial phases of professional services and systems integration projects where they perform high-level information technology and systems planning tasks.

- Both McKinsey and Booz Allen are now expanding into the other submodes of professional services, since these assignments would enable them to increase revenues from accounts they have penetrated.

EXHIBIT VII-5

Leading U.S. Professional Services Vendors Software Development Submode, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	CSC	287
2	IBM	272
3	EDS	263
4	Andersen Consulting	182
5	CGA	147
6	NYNEX/AGS	142
7	CTG	138
8	DEC	132
9	Unisys	130
9	Logicon	130
11	Ernst & Young	118
12	Hewlett-Packard	112
13	PRC	111
14	NCR	110
15	Coopers & Lybrand	106

EXHIBIT VII-6

Leading U.S. Professional Services Vendors Consulting Submode, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	IBM	130
2	EDS	125
3	CSC	123
4	McKinsey	103
5	Booz Allen	99
6	A.D. Little	95
7	Andersen Consulting	73
8	PRC	66
9	Unisys	53
10	Logicon	50

Consulting services have gained more attention lately since this type of service is growing at a faster rate than software development and also since consulting tends to have a higher profit margin than other professional services. In addition, it can provide the opportunity to develop a foothold for follow-on services.

- The advantages of consulting services have caused a number of vendors including CSC and CGA to strengthen their ability to offer these services during the last few years.

- Newer companies such as TSC have used consulting services as a means of making a successful entry into the information services business.

d. Education and Training

As shown in Exhibit VII-7, the education and training submode was led in 1990 by Applied Learning, which specializes in this mode. In addition to Applied Learning, there are a number of the major professional services firms in this submode, including computer manufacturers in top revenue positions—which is not surprising, due to the need for training as a component of systems development or modification.

EXHIBIT VII-7

Leading U.S. Professional Services Vendors Education and Training Submode, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	Applied Learning	105
2	IBM	88
3	EDS	80
4	CSC	65
5	Andersen Consulting	55
6	Logicon	41
7	NCR	30
7	PRC	30
9	DEC	27
9	Unisys	27

Although expenditures for education and training are growing faster than software development and almost as fast as consulting, most large professional services vendors do not compete for the business of training corporate personnel in software products as vigorously as smaller concerns do.

Vendor revenues that have been shown in the last three exhibits do not reflect the total amount of vendor activity in these submodes, since vendors may be performing the same services in systems integration projects.

e. Systems Operations

As Exhibit VII-8 illustrates, some of the leading vendors of professional services such as EDS and CSC are among the leaders in supplying systems operations services. Professional services capabilities can help in the provision of systems operations services, as discussed previously. As the interest in outsourcing grows, more professional services firms will become active in this service mode.

INPUT now classifies systems operations services as a separate service mode, since they are operational in nature. Further information on this mode can be found in the reports and program on systems operations now provided by INPUT.

EXHIBIT VII-8

Leading Systems Operations Vendors, 1990

Vendor	Revenue ($ Millions)
EDS	1,004
CSC	460
Systematics	185
IBM	170
Affiliated Computing Services	135
Shared Medical Systems	128
SIAC	123

2. Federal Government Professional Services Market

Exhibit VII-9 lists leading vendors of professional services to the federal government. A number of the leading vendors to the market as a whole receive a large percentage of their professional services revenue from the federal government.

- Some leading vendors such as BDM, PRC, Martin Marietta, and Centel are highly dependent on the federal government.
- Other vendors such as CSC, EDS and IBM are major vendors in the federal market as well as the non-federal market.

The list shown in Exhibit VII-9 does not contain a number of the vendors active in the market as a whole. Many large vendors such as Andersen Consulting, CTG and CGA do not appear on the list of leading federal vendors of professional services.

EXHIBIT VII-9

Leading Professional Services Vendors to the Federal Government, 1990

Vendor	Revenue ($ Millions)
Computer Sciences Corporation	323
Logicon	221
Electronic Data Systems	117
Grumman Data Systems	111
Unisys	108
BDM	106
PRC	105
Computer Data Systems Inc.	102
Martin Marietta	96
Centel Federal Systems	92
IBM	89
BBN	88
CACI	66
Syscon	63
Oracle	61
SAIC	54
A.D. Little	53
Mitre	50
Softech	38
Sterling Software	37

3. Non-Federal Professional Services Market

Leading vendors in the non-federal government market are shown in Exhibit VII-10. These vendors include companies active in the market as a whole, but exclude some large vendors of professional services such as Logicon, Syscon and Centel that specialize in the federal market.

EXHIBIT VII-10

Leading Professional Services Vendors Non-Federal Government Sector, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	IBM	401
2	EDS	351
3	Andersen Consulting	285
4	CGA	201
5	NYNEX/AGS	194
6	CTG	191
7	Ernst & Young	168
8	DEC	160
9	CSC	152
10	Hewlett-Packard	151
11	NCR	148
12	Coopers & Lybrand	138
13	CDC	116
14	A.D. Little	112
15	Applied Learning	105
16	KPMG	104
17	PRC	102

An examination of Exhibits VII-9 and VII-10 reveals a number of differences between vendors serving the federal and non-federal markets.

- Eight of the top 10 vendors in each of these exhibits are different. Only IBM, CSC, EDS and PRC are on both lists.

- Public accounting firms appear only on the list of vendors serving the non-federal market. Several of these firms have begun to address the federal market since it is a large market even if it is not growing as rapidly as other industry markets.

- The list of leading vendors in the non-federal market contains more manufacturers of computing equipment. The computer manufacturers that provide services to the federal government tend to be those making the greatest effort to market large equipment systems in the federal market.

- Firms with an aerospace background are on the list of leading federal vendors but not on the list of leading vendors in non-federal markets. Some of these firms have attempted to expand services in the non-federal marketplace in the past, but a few have recently reevaluated and/or reduced their services to the non-federal market.

4. Software Products Vendors

A list of software product vendors that generate revenue from professional services is shown in Exhibit VII-11. Few software product vendors manage to generate meaningful revenue from professional services in comparison to public accounting firms, for example, because they do not have as much experience in marketing and selling a service.

EXHIBIT VII-11

Leading Software Products Vendors in Professional Services, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	Oracle	94
2	Policy Management	65
3	CAI	47
4	American Software	42
5	Sterling	37
6 =	Compuware	31
6	Cadence	31

Oracle managed to generate revenue from systems integration as well as professional services by setting up activities dedicated to generating such revenue that were integrated with marketing plans for its software products.

5. Public Accounting Firms

The revenues of public accounting firms shown in Exhibit VII-12 illustrate that these firms have had considerable success in the professional services market. Three of the firms, Coopers & Lybrand, Price Waterhouse and Deloitte Touche have had some revenues reclassified as systems integration, so the revenues that are shown understate the total volume of professional services delivered by these firms.

EXHIBIT VII-12

Leading Public Accounting Firms in Professional Services, 1990

Rank	Vendor	Estimated Vendor Revenue ($ Millions)
1	Andersen Consulting	310
2	Ernst & Young	168
3	Coopers & Lybrand	145
4	KPMG Peat Marwick	104
5	Deloitte & Touche	90
6	Price Waterhouse	30

Public accounting firms have been able to take advantage of past contacts and relationships as well as experience in selling services to gain professional services work.

6. Computer Manufacturers

Professional services have been helpful in selling computing equipment and software products for computer manufacturers. In response to the increasing interest of users in buying solutions to business problems rather than just purchasing computing equipment and software products, computer manufacturers can utilize professional services to analyze problems more fully, modify or supplement software products to satisfy user needs and train user personnel to ensure that successful operation takes place.

Computer manufacturers have also made arrangements with other providers of professional services and software products who can help them solve a wider range of industrial problems and thereby market a greater volume of equipment systems. IBM uses Hogan, AMS and CTG, among other firms, and DEC benefits from relations with Ross and Comtex.

EXHIBIT VII-13

Leading Computer Manufacturers in Professional Services, 1990

Rank	Vendor
1	IBM
2	DEC
3	Unisys
4	Hewlett-Packard
5	NCR/AT&T

7. Telecommunications Vendors

Vendors in the telecommunications market, such as NYNEX, AT&T, Ameritech, Bell South, Bell Atlantic and Pacific Telesis have been active in or explored opportunities in the professional services market. NYNEX has been the most active and is the largest vendor of this group in the professional services market, with considerable penetration the U.S. and overseas financial industry.

D

Mergers and Acquisitions

Through mergers, joint ventures and alliances, professional services vendors have attempted to become more competitive. A number of recent arrangements by vendors is shown in Exhibits VII-14 and VII-15.

- These arrangements can fill gaps or expand product lines or help to penetrate new industries.
- Arrangements with other firms can also help to leverage sales contacts and expand the range of industries that can be approached for sales.

Vendors who work together can also sell a set of products and services that may provide a solution or improve the solution that can be offered. This synergy has become of increasing interest to potential users.

EXHIBIT VII-14

Examples of Acquisitions/Investments

Acquirer	Company or Service	Comment/Strengths
AGS Info. Services	Decision Resources	Management Consulting and EIS
AGS	Stockholder Systems	Financial Applications
AMS	Invested in Advantage KBS	Consulting re: knowledge-based systems
Bull HN Info. Sys.	Honeywell Federal Systems	Strengthens federal marketing and skills
CA	Newtrend	Expand information services opportunities in banking
Coopers & Lybrand	Joint venture with IBM through Meritus	To address manufacturing market
CAP Sogeti	United Research	Consulting capabilities
Computer Task Group	Connolly Data Systems	Strengthens capabilities
Computer Sciences Corp.	Analytics	Strengthens capabilities
CSK, Japan	Micrognosis	Global penetration of financial services markets
C3	Telos	Expand government penetration
DEC	PRC	SI in Far East
EDS	Infocel	GIS and other UNIX software products for local government
EDS	McDonnell Douglas Systems Integration	Strengthens CAD/CAM and manufacturing business
IBM	Metaphor	Object-oriented capabilities
Ernst & Young	CASE Research	Strengthen CASE capabilities
Ross Systems	Pioneer Computer Ltd.	Process manufacturing knowledge and European market presence
SHL Systemhouse	Computer Marketing	Expands international SI opportunities
Titan	Stonehouse	Expand government penetration

EXHIBIT VII-15

Examples of Alliances/Joint Arrangements

Firm	Alliance	Comments/Strengths of Ally
American Software	Transtech Datansys	German market
Andersen	SAP	Manufacturing and distribution application products
Andersen	IBM, HP, DEC, TI Sun Microsystems Olivetti, Motorola	Equipment systems support
Apple	CGI and Bell Atlantic	Tie Macintosh computers to IBM environments
Coopers & Lybrand	SAP	Manufacturing and distribution application products
Coopers & Lybrand	JD Edwards	Accounting software products
Coopers & Lybrand	NMI	Network management
Coopers & Lybrand	Software 2000	AS/400 inventory, warehouse, financial application products
DEC	Andersen Consulting	Distribution and logistics industries
DEC	CSC	CIM and distribution/logistics
DEC	Deloitte & Touche	CIM
EDS	Business Systems Group	Client/server capabilities
Firm	Alliance	Comments/Strengths of Ally
EDS	ASK	To market ASK manufacturing application products to EDS clients
Ernst & Young	IBM	Business partner
Ernst & Young	Xerox	Imaging
Ernst & Young	DEC	Health care
Ernst & Young	Software 2000	AS/400 financial, warehouse, inventory application products

EXHIBIT VII-15 (CONT)

Examples of Alliances/Joint Arrangements

Firm	Alliance	Comments/Strengths of Ally
KPMG	XA Systems	Software engineering
KPMG	Brightbill Roberts	Object-oriented software
KPMG	IBM	AS/400 and SI
KPMG	Unisys	Open systems architecture, CASE, image processing
Price Waterhouse	PeopleSoft	Human resource software products
Price Waterhouse	SAP	Manufacturing and distribution systems
Price Waterhouse	Software 2000	AS/400 inventory/warehouse/ financial software products
Price Waterhouse	Tesseract	Human resource software
Price Waterhouse	CASE vendors	Re-engineering activities

E

Vendor Profiles

Six professional services vendors with differences in strategies, products, and/or markets are profiled in this section. They include:

- American Management Systems
- American Software
- Analysts International
- Andersen Computing
- Computer Task Group
- Logicon

Each profile contains information on company strategies, background, and key products and services. Additional information can be found in INPUT's Vendor Analysis Program (VAP).

1. American Management Systems, Inc., 1777 North Kent St., Arlington, VA 22209

a. Company Strategy

AMS uses its proprietary software and strength in modifying it, and its strength in professional services and productivity tools to address complex user needs in financial services, government, education, energy and telecommunications companies. This work has involved systems integration as well as professional services assignments.

b. Company Background

American Management Systems, Inc. (AMS), founded in 1970, offers professional services, systems integration and systems operation services. Applications software owned by the company is used in these assignments and is not sold separately. Revenues for 1990 of $251 million had increased by 12% over 1989. AMS is one of the vendors in which IBM has invested.

c. Key Products and Services

The proprietary software that AMS uses in professional services and systems integration assignments includes credit management, letter of credit, collection, corporate account management and funds transfer systems for banking; accounting and financial systems for government and education; financial and information systems for energy companies; and billing, service management, and message processing systems for the telecommunications systems industry. AMS also has a number of productivity tools and data management and other systems software available to aid professional services work.

2. American Software, Inc. 470 East Paces Ferry Road, N.E. Atlanta, GA 30305

a. Company Strategy

American Software leverages the sales of its applications software products to gain a substantial portion of its revenue (about 37%) from the sale of education and training, consulting and software modification and development. The software products that are sold, an integrated line of cross-industry and industry-specific software products, have been selected to support multiple types of applications in the manufacturing, distribution, public utilities, transportation and financial industries. The use of its applications software products also ensures repeat business for professional services.

b. Company Background

American Software, founded in 1970, provides application products for IBM mainframes, minis and PCs. Half of its revenue comes from the maintenance of software and sale of professional services. Revenues of $99,802 in 1990 increased 25% from 1989.

c. Key Products and Services

The applications software products of American Software include forecasting and inventory management, purchasing and materials control, order processing and receivables, MRP (manufacturing resource planning), DRP (distribution resource planning), financial application products that can be integrated with MRP or DRP, and application systems for the utilities and health care industries. These products are provided together with application maintenance and professional services to analyze client problems and tailor solutions to meet client needs.

3. Analysts International Corporation, 7615 Metro Boulevard, Minneapolis, Minnesota 55435

a. Company Strategy

The company combines continuing (repeat) assignments of professional services work at a high level of technical capability together with contract services work. The technical capabilities utilized to gain assignments include telecommunications, open systems, and software engineering work that is often carried on at the company research facility.

b. Company Background

Analysts International Corporation (AIC) was formed in 1966 as a publicly held corporation to provide professional services to a wide variety of industries. Revenue in 1990 reached $113.2 million, a 16% increase over 1989.

c. Key Products and Services

Over 90% of revenue in 1990 was from professional services. The company has extensive experience in designing large-scale and small-scale systems, including systems for funds transfer networks, workstations for manufacturing processes, and EDI applications. Some of AiC's assignments have been as complex as major systems integration projects and AiC plans to increase its systems integration business. The company has also gained a small amount of revenue from three financial application software products.

4. Andersen Consulting, Arthur Andersen & Co., 69 West Washington Street, Chicago, IL 60602

a. Company Strategy

Andersen utilizes demonstrations of working solutions to manufacturing and retail distribution problems as a means of appealing to and closing business with prospects. Andersen also emphasizes its knowledge of industries and applications, particularly in manufacturing and distribution, in presentations and consulting assignments to gain large professional services and systems integration contracts.

By means of studying the performance and problems of companies in its areas of interest, Andersen has been able to suggest opportunities to gain revenues or improve earnings to companies that it contacts. The firm uses acquisitions and alliances to gain additional resources for addressing business.

b. Company Background

Andersen Consulting was set up by Arthur Andersen & Co. as a separate firm in 1988 to address its rapidly growing and large volume of information services business. Estimated worldwide revenues in 1990 were $2.1 billion, 30% above the revenue for 1989. U.S. revenues increased by about 21% to $1.2 billion in 1990.

c. Key Products and Services

Over half of 1990 revenue was derived from systems integration and about 25% was from professional services. Systems operations revenue increased to 8% of revenue in 1990, and revenue was also obtained from applications and systems software products and network services. Andersen has proprietary software products supporting software engineering and a systems development methodology.

5. Computer Task Group, Inc., 800 Delaware Avenue, Buffalo, NY 14209

a. Company Strategy

CTG relies primarily on its strength and experience in delivering professional services to meet a range of problems—from large complex jobs to tasks requiring the knowledge of certain technological capabilities. Strength has also been developed to obtain network development and integration work and systems integration contracts. CTG can bring its capabilities to bear on a wide range of industries, including discrete and process manufacturing, business services, banking and finance, insurance, and state and local government.

b. Company Background

Computer Task Group, founded in 1966, is one of the largest vendors of professional services concentrating on the non-federal government marketplace. It provides systems integration and a small amount of systems operations services as well as professional services. Its U.S. revenues in 1990 were $231.2 million, a 5% increase from 1989.

c. Key Products and Services

Over 80% of 1990 revenue was from professional services, with the balance made up of systems integration services and a small amount of systems operations work. CTG provides consultants who are experienced in industry problems as well as in technology. CTG's staff can augment the client's staff and become part of the project team on a specific application or project, or CTG can manage and staff an entire project. CTG has experience in supporting large clients (85 of the Fortune 100) with projects involving a single office or multiple sites.

6. Logicon, Inc., 3701 Skypark Drive, Torrance, CA 90505-4794

a. Company Strategy

Logicon, a consistent leader in professional services revenues from the federal government, relies primarily on its knowledge and experience in military applications involving command, control, communications, and intelligence systems. The company has bolstered its business by offering non-information services research related to science and technology. In view of changes in government expenditures, Logicon is exploring products that can take advantage of its technological capabilities that would appeal to both government and commercial customers.

b. Company Background

Logicon, incorporated in 1961, has developed and regularly acquired companies with knowledge and experience in the areas of defense-related applications in which Logicon is interested. A small percentage of these activities could be useful in civil government or commercial applications, including scientific analysis and engineering, and civil government intelligence. Revenues of $257.3 million in 1990 were 1% above revenues in 1989.

c. Key Products and Services

Over 85% of Logicon's revenues are from professional services. The company also provides non-information services concerning science and technology. The chief capability of the firm is its set of technological capabilities, which it is now reviewing with the objective of extending its business beyond the military applications of the federal government.

Conclusions and Recommendations

To be published at a later date

Appendixes

Definition of Terms

A

Introduction

INPUT's *Definition of Terms* provides the framework for all of INPUT's market analyses and forecasts of the information services industry. It is used for all U.S. programs. The structure defined in Exhibit A-1 is also used in Europe and for the worldwide forecast.

One of the strengths of INPUT's market analysis services is the consistency of the underlying market sizing and forecast data. Each year INPUT reviews its industry structure and makes changes if they are required. When changes are made they are carefully documented and the new definitions and forecasts reconciled to the prior definitions and forecasts. INPUT clients have the benefit of being able to track market forecast data from year to year against a proven and consistent foundation of definitions.

The changes made in INPUT definitions this year are as follows:

- *Systems Operations Submodes* - the submodes of systems operations have been redefined from processing services and professional services to platform systems operations and applications systems operations.
- *Business Services Industry* - the industry sectors of business services and personal services have been combined into a single business services sector.
- *Transportation Industry* - the information services expenditures relating to airline reservation systems have been returned to the transportation sector where they resided prior to 1990.

B

Overall Definitions and Analytical Framework

1. Information Services

Information Services are computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services which will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software products, either systems software or applications software products (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)
- Bundled combinations of products and services where the vendor assumes total responsibility for the development of a custom solution to an information systems problem (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form—typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line data bases, on-line news and data feeds, etc. (called *Network Services*)

In general, the market for information services does not involve providing equipment to users. The exception is where the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (i.e., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the information services industry consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user

information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

2. Market Forecasts/User Expenditures

All information services market forecasts are estimates of *User Expenditures* for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems which are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to end users)

- Missed counting, which can occur when sales to end users go through indirect channels such as mail order retailers

Captive Information Services User Expenditures are expenditures for products and services provided by a vendor that is part of the same parent corporation as the user. These expenditures are not included in INPUT forecasts.

Non-captive Information Services User Expenditures are expenditures that go to vendors that have a different parent corporation than the user. It is these expenditures which constitute the information services market analyzed by INPUT and that are included in INPUT forecasts.

3. Delivery Modes

Delivery Modes are defined as specific products and services that satisfy a given user need. While *Market Sectors* specify *who* the buyer is, *Delivery Modes* specify *what* the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- *Processing Services*
- *Network Services*
- *Professional Services*
- *Applications Software Products*
- *Systems Software Products*

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- *Turnkey Systems*
- *Systems Operations*
- *Systems Integration*

Section C describes the delivery modes and their structure in more detail.

4. Market Sectors

Market Sectors or markets are groupings or categories of the users who purchase information services. There are three types of user markets:

- *Vertical Industry* markets, such as Banking, Transportation, Utilities, etc. These are called "industry-specific" markets.
- *Functional Application* markets, such as Human Resources, Accounting, etc. These are called "cross-industry" markets.
- *Other* markets, which are neither industry- nor application-specific, such as the market for systems software products and much of the on-line data base market.

Specific market sectors used by INPUT are defined in Section E, below.

5. Other

Outsourcing is defined as the contracting of information systems functions to outside vendors. Outsourcing should be viewed as the opposite of *insourcing*: anything that information systems management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

Information systems has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that information systems management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service where the vendor must compete against the client firm's own internal resources. Therefore, the entire information services industry can be considered an outsourcing market.

C

Delivery Modes and Submodes

Exhibit A-1 provides the overall structure of the information services industry as defined and used by INPUT. This section of *Definition of Terms* provides definitions for each of the delivery modes and their submodes or components.

EXHIBIT A-1

Information Services Industry Structure—1991

Source: INPUT

1. Software Products

INPUT divides the software products market into two delivery modes: systems software and applications software.

The two delivery modes have many similarities. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's sites. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the professional services delivery mode. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

a. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. INPUT divides systems software products into three submodes.

- *Systems Control Products* - Software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control, and spoolers.

- *Operations Management Tools* - Software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities, and capacity management.

- *Applications Development Tools* - Software programs used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Included are traditional programming languages, 4GLs, data dictionaries, data base management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) which are directly invoked by an applications program.

INPUT also forecasts the systems software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

b. Applications Software Products

Applications software products enable a user or group of users to support an operational or administrative process within an organization. Examples include accounts payable, order entry, project management and office systems. INPUT categorizes applications software products into two submodes.

- *Industry-Specific Applications Software Products* - Software products that perform functions related to fulfilling business or organizational needs unique to a specific industry (vertical) market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.

- *Cross-Industry Applications Software Products* - Software products that perform a specific function that is applicable to a wide range of industry sectors. Examples include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

INPUT also forecasts the applications software products delivery mode by platform level: mainframe, minicomputer and workstation/PC.

2. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single product developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems, or embedded computer systems for military applications.

Computer manufacturers (e.g., IBM or DEC) that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller (VAR):* A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems have three components:

- Equipment - computer hardware supplied as part of the turnkey system
- Software products - prepackaged systems and applications software products
- Professional services - services to install or customize the system or train the user, provided as part of the turnkey system sale

3. Processing Services

This delivery mode includes three submodes: transaction processing, utility processing, and "other" processing services.

- *Transaction Processing* - Client uses vendor-provided information systems—including hardware, software and/or data networks—at the vendor site or customer site to process transactions and update client data bases. Transactions may be entered in one of four modes:
  - *Interactive* - Characterized by the interaction of the user with the system for data entry, transaction processing, problem solving and report preparation: the user is on-line to the programs/files stored on the vendor's system.
  - *Remote Batch* - Where the user transmits batches of transaction data to the vendor's system, allowing the vendor to schedule job execution according to overall client priorities and resource requirements.
  - *Distributed Services* - Where users maintain portions of an application data base and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.
  - *Carry-in Batch* - Where users physically deliver work to a processing services vendor.
- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or data bases, enabling clients to develop their own programs or process data on the vendor's system.
- *Other Processing Services* - Vendor provides service—usually at the vendor site—such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

4. Systems Operations

Systems operations was a new delivery mode introduced in the 1990 Market Analysis and Systems Operations programs. It was created by taking the Systems Operations submode out of both Processing Services and Professional Services. For 1991 the submodes have been redefined as indicated below.

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submodes where the difference is whether the support of applications, as well as data center operations, is included.

- *Platform systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, without taking responsibility for the user's application systems.

- *Applications systems operations* - the vendor manages and operates the computer systems, often including telecommunications networks, and is also responsible for maintaining, or developing and maintaining, the user's application systems.

In the federal government market. systems operation services are also defined by equipment ownership with the terms "COCO" (Contractor-Owned, Contractor-Operated), and "GOCO" (Government-Owned, Contractor-Operated).

The ownership of the equipment, which was the previous basis for the systems operations submodes, is no longer considered critical to the commercial market. Most of the market consists of systems operations relationships using vendor-owned hardware. What is now critical is the breadth of the vendor/client relationship as it expands beyond data center management to applications management.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site. Systems operations can also be referred to as "resource management" or "facilities management."

5. Systems Integration (SI)

Systems integration is a vendor service that provides a complete solution to an information system, networking or automation requirement through the custom selection and implementation of a variety of information

system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

- *Equipment* - information processing and communications equipment required to build the systems solution. This component may include custom as well as off-the-shelf equipment to meet the unique needs of the project. The systems integration equipment category excludes turnkey systems by definition.

- *Software products* - prepackaged applications and systems software products.

- *Professional services* - the value-added component that adapts the equipment and develops, assembles, or modifies the software and hardware to meet the system's requirements. It includes all of the professional services activities required to develop, and if included in the contract, operate an information system, including consulting, program/project management, design and integration, software development, education and training, documentation, and systems operations and maintenance.

- *Other services* - most systems integration contracts include other services and product expenditures that are not easily classified elsewhere. This category includes miscellaneous items such as engineering services, automation equipment, computer supplies, business support services and supplies, and other items required for a smooth development effort.

Systems integrators perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom software design and development
- Custom hardware design and development
- Systems implementation, including testing, conversion and post-implementation evaluation and tuning

- Life cycle support, including
  - System documentation and user training
  - Systems operations during development
  - Systems maintenance

6. Professional Services

This category includes three submodes: consulting, education and training, and software development.

- *Consulting:* Services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of the information system, including equipment, software, networks and systems operations.

- *Education and Training:* Products and services related to information systems and services for the professional and end user, including computer-aided instruction, computer-based education, and vendor instruction of user personnel in operations, design, programming, and documentation.

- *Software Development:* Services include user requirements definition, systems design, contract programming, documentation, and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

7. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two submodes: *Electronic Information Services,* which involve selling information to the user, and *Network Applications,* which involve providing some form of enhanced transport service in support of a user's information processing needs.

a. Electronic Information Services

Electronic information services are data bases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnosis, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the data bases. Although users may load extracted data into their own computer systems, the electronic information

vendor provides no data processing or manipulation capability and the users cannot update the vendor's data bases.

The two kinds of electronic information services are:

- *On-line Data Bases* - Structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- *News Services* - Unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

b. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services which involve adding such functions as automatic error detection and correction, protocol conversion, and store-and-forward message switching to the provision of basic network circuits.

While VAN services were originally provided only by specialized VAN carriers (Tymnet, Telenet, etc.), today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers. The following are examples of VAN services.

- *Electronic Data Interchange (EDI)* - Application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI interchange standards. This software may be provided as part of the VAN service or may be resident on the organization's own computers.

- *Electronic Information Exchange (EIE)* - Also known as electronic mail (E-mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex,

TWX, and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains videotex and pure network management services. Videotex is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to data bases and offer the inquirer the ability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, and more.

  Network management services included here must involve the vendor's network and network management systems as well as people. People-only services are included in professional services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in systems operations.

D

Sector Definitions

1. Industry Sector Definitions

INPUT has structured the information services market into 15 generic industry sectors, such as process manufacturing, insurance, transportation, etc. The definitions of these sectors are based on the 1987 revision of the Standard Industrial Classification (SIC) Code system. The specific industries (and their SIC Codes) included under these generic industry sectors are detailed in Exhibit A-2.

EXHIBIT A-2

Industry Sector Definitions

Industry Sector	SIC Code	Description
Discrete Manufacturing	23xx	Apparel and other finished products
	25xx	Furniture and fixtures
	27xx	Printing, publishing and allied industries
	31xx	Leather and leather products
	34xx	Fabricated metal products, except machinery and transportation equipment
	35xx	Industrial and commercial machinery and computer equipment
	36xx	Electronic and other electrical equipment and components, except computer equipment
	37xx	Transportation equipment
	38xx	Instruments; photo/med/optical goods; watches/clocks
	39xx	Miscellaneous manufacturing industry
Process Manufacturing	10xx	Metal mining
	12xx	Coal mining
	13xx	Oil and gas extraction
	14xx	Mining/quarrying nonmetalic minerals
	20xx	Food and kindred products
	21xx	Tobacco products
	22xx	Textile mill products
	24xx	Lumber and wood products, except furniture
	26xx	Paper and allied products
	28xx	Chemicals and allied products
	29xx	Petroleum refining and related industries
	30xx	Rubber and miscellaneous plastic products
	32xx	Stone, clay, glass and concrete products
	33xx	Primary metal industries
Transportation Services	40xx	Railroad transport
	41xx	Public transit/transport
	42xx	Motor freight transport/warehousing
	43xx	U.S. Postal Service
	44xx	Water transportation
	45xx	Air transportation (including airline reservation services in 4512)
	46xx	Pipelines, except natural gas
	47xx	Transportation services (including 472x, arrangement of passenger transportation)

EXHIBIT A-2 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Utilities	49xx	Electric, gas and sanitary services
Telecommunications	48xx	Communications
Retail Distribution	52xx	Building materials
	53xx	General merchandise stores
	54xx	Food stores
	55xx	Automotive dealers, gas stations
	56xx	Apparel and accessory stores
	57xx	Home furniture, furnishings and accessory stores
	58xx	Eating and drinking places
	59xx	Miscellaneous retail
Wholesale Distribution	50xx	Wholesale trade - durable goods
	51xx	Wholesale trade - nondurable goods
Banking and Finance	60xx	Depositary institutions
	61xx	Nondepositary institutions
	62xx	Security and commodity brokers, dealers, exchanges and services
	67xx	Holding and other investment offices
Insurance	63xx	Insurance carriers
	64xx	Insurance agents, brokers and services
Health Services	80xx	Health services
Education	82xx	Educational services

EXHIBIT A-2 (CONT.)

Industry Sector Definitions

Industry Sector	SIC Code	Description
Business Services	65xx	Real estate
	70xx	Hotels, rooming houses, camps, and other lodging places
	72xx	Personal services
	73xx	Business services (except hotel reservation services in 7389)
	7389x	Hotel reservation services
	75xx	Automotive repair, services and parking
	76xx	Miscellaneous repair services
	78xx	Motion pictures
	79xx	Amusement and recreation services
	81xx	Legal services
	83xx	Social services
	84xx	Museums, art galleries, and botanical/zoological gardens
	86xx	Membership organizations
	87xx	Engineering, accounting, research, management, and related services
	89xx	Miscellaneous services
Federal Government	9xxx	
State and Local Government	9xxx	
Miscellaneous Industries	01xx	Agricultural production - crops
	02xx	Agricultural production - livestock/animals
	07xx	Agricultural services
	08xx	Forestry
	09xx	Fishing, hunting and trapping
	15xx	Building construction - general contractors, operative builders
	16xx	Heavy construction - contractors
	17xx	Construction - special trade contractors

2. Cross-Industry Sector Definitions

In addition to these vertical industry sectors, INPUT has identified seven cross-industry or horizontal market sectors. These sectors or markets involve multi-industry applications such as human resource systems, accounting systems, etc. In order to be included in an industry sector, the service or product delivered must be specific to that sector only. If a service or product is used in more than one industry sector, it is counted as cross-industry. The seven cross-industry markets are:

Accounting - consists of applications software products and information services that serve such functions as:

- General ledger
- Accounts payable
- Accounts receivable
- Billing/invoicing
- Fixed assets
- International accounting
- Purchasing
- Taxation
- Financial consolidation

- Excluded are accounting products and services directed to a specific industry, such as tax processing services for CPAs and accountants within the business services industry sector.

Human Resources - consists of application solutions purchased by multiple industry sectors to serve the functions of human resources management and payroll. Examples of specific applications within these two major functions are:

- Employee relations
- Benefits administration
- Government compliance
- Manpower planning
- Compensation administration
- Applicant tracking
- Position control
- Payroll processing

Education and Training - consists of education and training for information systems professionals and users of information systems, as well as the use of computer-based training tools for the training of any employee on any subject.

- The education and training cross-industry sector only considers education and training offered for a noncaptive market; in other words, this sector does not include educational services provided by information services vendors to their customers for training on their own products.

- Education and training that is provided in a classroom setting, live, is not included in this cross-industry sector. This sector is not to be confused with the education industry-specific sector, the subject of another MAP report, which addresses primary and secondary education as a vertical market for IS services.

Office Systems consists of the following:

- Integrated office systems (IOS)
- Word processing
- Desktop publishing
- Graphics

- IOSs—such as IBM's OfficeVision, HP's NewWave Office and DEC's All-In-1—typically include the following core functions, all of which are accessed from the same desktop: electronic mail, decision support systems, time management and filing systems.

- Office systems graphics include presentation graphics (which represent the bulk of office systems graphics), paint and line art, page description languages, and electronic form programs.

Engineering and Scientific encompasses the following applications:

- Computer-aided design and engineering (CAD and CAE)
- Structural analysis
- Statistics/mathematics/operations research
- Mapping

- Computer-aided manufacturing (CAM) or CAD that is integrated with CAM is excluded from the cross-industry sector as it is specific to the manufacturing industries. CAD or CAE that is dedicated to integrated circuit design is also excluded because it is specific to the semiconductor industry.

Planning and Analysis consists of software products and information services in four application areas:

- Executive Information Systems (EIS)
- Financial modeling or planning systems
- Spreadsheets
- Project management

Other encompasses marketing/sales and electronic publishing application solutions.

- Sales and marketing includes:
  - Sales analysis
  - Marketing management
  - Demographic market planning models
- The fundamental difference between electronic publishing and desktop publishing (within the office systems sector) is that electronic publishing encompasses a method of document management and control from a single point—regardless of how many authors/locations work on a document—whereas desktop publishing is a personal productivity tool and is generally a lower end product residing on a personal computer.
- Electronic or computer publishing systems that are sold strictly and specifically to commercial publishers, printers, and typesetters are excluded from cross-industry consideration and are included in the discrete manufacturing industry.

3. Delivery Mode Reporting by Sector

This section describes how the delivery mode forecasts relate to the market sector forecasts. Exhibit A-3 summarizes the relationships.

- *Processing services* - the transaction processing services submode is forecasted for each industry and cross-industry market sector. The utility and other processing services submodes are not considered industry or cross-industry specific and are only forecasted for the total market.
- *Turnkey systems* - all of the turnkey systems delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. Each component of turnkey systems (equipment, software products and professional services) is forecasted by market sector.
- *Applications software products* - all of the applications software products delivery mode is considered either industry or cross-industry specific and is forecasted for the 15 industry and 7 cross-industry sectors. In addition, each forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.
- *Systems operations* - all of systems operations is considered industry specific. Each of the submodes (platform and applications systems operations) is forecasted for each of the 15 industry sectors.

EXHIBIT A-3

Delivery Mode versus Market Sector Forecast Content

Delivery Mode	Submode	Market Sectors		
		Industry Sectors	Cross-Industry Sectors	Other
Processing Services	Transaction	X	X	
	Utility			X
	Other			X
Turnkey Systems		X	X	
Applications Software Products		X	X	
Systems Operations	Platform	X		
	Applications	X		
Systems Integration		X		
Professional Services		X		
Network Services	Network Applications	X		
	Electronic Information Services	X		X
Systems Software Products				X

- *Systems integration* - all of systems integration is considered industry specific. Each of the components of systems integration (equipment, software products, professional services and other services) is forecasted for each of the 15 industry sectors.

- *Professional services* - all of professional services is considered industry specific. Each of the submodes (consulting, education and training, and software development) is forecasted for each of the 15 industry sectors.

- *Network services* - all of the network applications submode of network services is considered industry specific and is forecasted for each of the 15 industry sectors. The electronic information services submode is considered to have both industry-specific and non-specific elements.

The forecast for electronic information systems includes forecasts for the 15 industry sectors as well as an additional forecast component that applies to the market as a whole.

- *Systems software products* - All of the submodes (systems control, operations management, applications development) are considered neither industry- nor cross-industry specific. They are only forecasted in total. In addition, each submode forecast is broken down by platform level: mainframe, minicomputer and workstation/PC.

E

Vendor Revenue and User Expenditure Conversion

The size of the information services market may be viewed from two perspectives: vendor (producer) revenues and user expenditures. While the primary data for INPUT's research is vendor interviews, INPUT defines and forecasts the information services market in terms of end-user expenditures. End-user expenditures reflect the markup in producer sales when a product such as software is delivered through indirect distribution channels (such as original equipment manufacturers (OEMs), retailers and distributors). The focus on end-user expenditure also eliminates the double counting of revenues that would occur if sales were tabulated for both producer (e.g., Lotus) and distributor (e.g., BusinessLand).

For most delivery modes, vendor revenues and user expenditures are fairly close. However, there are some areas of significant difference. Many microcomputer software products, for example, are marketed through indirect distribution channels. To capture the valued added through these indirect distribution channels, adjustment factors that incorporate industry discount ratios are used to convert estimated information services vendor revenues to end-user expenditures.

For some delivery modes, including software products, systems integration and turnkey systems, there is a significant volume of intra-industry sales. For example, systems integrators purchase software and subcontract the services of other professional services vendors. And turnkey vendors incorporate purchased software into the systems they sell to end users.

To account for such intra-industry transactions, INPUT uses other conversion ratios to derive the estimate of end-user expenditures.

Exhibit A-4 summarizes the net effect of the various ratios used by INPUT to convert vendor revenues to end-user expenditure (market size) figures for each delivery mode.

EXHIBIT A-4

Vendor Revenue to User Expenditure Conversion

Delivery Mode	Vendor Revenue Multiplier
Applications Software Products	1.18
Systems Software Products	1.10
Systems Operations	1.00
Systems Integration	0.99
Professional Services	0.99
Network Services	0.99
Processing Services	0.99
Turnkey Systems	0.95

Appendixes

Data Base Reconciliation

A

Reconciliation of Professional Services Industry

The 1990 report forecast a 1990 professional services industry of $16,764 million. The actual 1990 professional services industry size was $16,764 million. (See Exhibit B-1.)

EXHIBIT B-1

Professional Services User Expenditure Forecast by Delivery Mode, 1990-1996 ($ Millions)

Delivery Mode	1990 ($M)	Growth 90-91 (%)	1991 ($M)	1992 ($M)	1993 ($M)	1994 ($M)	1995 ($M)	1996 ($M)	CAGR 91-96 (%)
Professional Services Total	16,764	6	17,757	19,413	21,236	23,243	25,454	27,892	9
Consulting	3,902	9	4,234	4,790	5,419	6,132	6,934	7,848	13
Software Development	10,402	5	10,872	2,948	3,281	13,467	14,457	15,525	7
Education and Training	2,460	8	2,651	2,948	3,281	3,650	4,063	4,519	11

The five-year growth rate changed from 12% to 9%, reflecting the following trends:

- Slower economic growth in the forecast period than previously forecast
- A small shift in consulting and software development services toward systems integration-based services

g. Insurance

The insurance industry CAGR has been reduced from 14% to 9%, based on the following factors:

- Weakness in the insurance industry leading to failures and mergers will decrease the number of prospects for professional services.
- The continued use of large vendors that can provide systems integration and systems operation services and that have networks or network expertise available will reduce opportunities for professional services vendors during the planning period.

h. Medical

The CAGR for the medical industry has been reduced from 12% to 9% for the following reasons:

- Funding for many hospitals and health facilities has been reduced.
- Reimbursements and payments from insurance companies, medical plans and government offices have been subject to more rigid controls and have not met hospital expectations.
- Some hospitals have become interested in systems integration and systems operations as means of addressing staff and budget limitations.

i. Education

The CAGR for education has been reduced from 13% to 10% in view of the following factors:

- Budgets have been under pressure throughout the country.
- Grants and other government contributions have been eliminated or reduced.
- The use of systems operations and integration has been more actively promoted in this industry, reducing professional services opportunities.

j. Miscellaneous Industries

The CAGR for miscellaneous industries has been reduced from 12% to 8% for the following reasons:

- The slow economy will continue to have an impact on the construction and agricultural sectors during the forecast period.

- Margins are low in this sector because revenues have been unable to keep pace with costs. Investment in professional services will not be able to maintain the previous forecast level as a result.